

XXXI.—*The Fossil Plants of the Carboniferous Rocks of Canonbie, Dumfriesshire, and of Parts of Cumberland and Northumberland.* By ROBERT KIDSTON, F.R.S.L. & E., F.G.S. (With Five Plates.)

(Read June 15, 1903. Issued separately December 7, 1903.)

This communication deals with the fossil plants of the Calciferous Sandstone Series and Carboniferous Limestone Series of Eskdale and Liddesdale; of the Lower Coal Measures of Canonbie; of the Middle Coal Measures of Byre Burn, Canonbie; and of the Upper Coal Measures, Jockie's Syke, Cumberland; to which is added a list of the fossil plants of the Calciferous Sandstone Series of Cumberland and Northumberland, with the object of comparing them with those from the corresponding series in Scotland.

The geological structure of the areas from which the fossil plants were derived has been fully described by Dr JOHN HORNE, F.R.S., and Dr B. N. PEACH, F.R.S.* It is therefore unnecessary for me to make any remarks on this part of the subject, so I have restricted my geological notes to a bare statement of the *horizons* of the localities from which the plants were collected.

I must here express my thanks and great indebtedness to Mr J. J. H. TEALL, F.R.S., Director of the Geological Survey of the United Kingdom, for permission to use the Collections of Plants made by the Geological Survey. I wish also to acknowledge the valuable assistance I received from Mr A. MACCONOCHIE, by whom the greater portion of the specimens were collected on the Scotch side of the Border, and to Mr JOHN RHODES, of the Geological Survey of England, who collected almost all the specimens from the Lower Carboniferous Rocks of Cumberland and Northumberland.

I am also indebted to the late Mr HUGH MILLER, F.R.S.E., for my knowledge of some of the horizons of the Lower Carboniferous Plants from Cumberland and Northumberland, and to Dr HORNE and Dr PEACH for the horizons of the Plants from the Lower Carboniferous of Dumfriesshire.

For the Lower Carboniferous Rocks of Berwickshire and some other districts which are included in the paper by Dr HORNE and Dr PEACH I have not given lists of the fossil plants, as these are reserved for another occasion.

THE FOSSIL PLANTS OF THE CALCIFEROUS SANDSTONE SERIES OF
ESKDALE AND LIDDESDALE.

The great part of the specimens on which the list of the fossil plants of the Calciferous Sandstone Series of Eskdale and Liddesdale is founded was collected by

* "The Canonbie Coal Field: its Geological Structure and Relations to the Carboniferous Rocks of the North of England and Scotland." By B. N. PEACH, LL.D., F.R.S., and J. HORNE, LL.D., F.R.S. *Trans. Roy. Soc. Edin.*, vol. xl. p. 835.

Mr A. MACCONOCHIE, of the Geological Survey of Scotland, about twenty years ago, and on these I contributed a paper to this Society in 1883,* and to Mr MACCONOCHIE, I believe, is also due the credit of discovering all the localities from which fossil plants have been collected from this series in Dumfriesshire.

After the publication of my paper dealing with the Eskdale and Liddesdale fossil plants, some of Mr MACCONOCHIE's localities were visited by other collectors and a few specimens collected by Mr T. STOCK, and a larger series, which was acquired by the Geological Department of the British Museum, from Glencartholm, were subsequently examined by me. The present list contains the results of all these collections, and I take this opportunity of correcting one or two of my earlier identifications which further investigation has shown to be inaccurate.

To save repetition, I give here a list of all the localities and horizons from which the specimens have been derived, as in the appended list of species the localities are given in a contracted form and the horizons are not stated, as at no one locality have the fossil plants been collected from more than one horizon.

- I. *Locality*.—Bank of River Esk, Glencartholm, Eskdale.
Horizon.—"Carbonaceous Series" (= "Scremerston Series").†
- II. *Locality*.—Foot of Tarras Water, three miles south of Langham, Eskdale.
Horizon.—Top of the "Cementstone Series" (= "Ballagan Series"), not many feet below the base of the Fell Sandstones.
- III. *Locality*.—Archerbeck, above Millsteads, Canonbie.
Horizon.—Lawston Linn Coal Group (= "Scremerston Series").†
- IV. *Locality*.—Kershope Burn, Liddesdale.
Horizon.—"Carbonaceous Series" (= "Scremerston Series").†
- V. *Locality*.—Tweeden Burn (near Tweedenhead (?)), Liddesdale.
Horizon.—"Carbonaceous Series" (= "Scremerston Series").†
- VI. *Locality*.—Docken Beck, near Irvine House, South of Langholm.
Horizon.—Top of the "Cementstone Series" (= "Ballagan Series").
- VII. *Locality*.—Tinnis Burn, Liddesdale.
Horizon.—"Cementstone Series" (= Ballagan Series).
- VIII. *Locality*.—Burn near Saughtree, Liddesdale.
Horizon.—Not far above the base of the "Cementstone Series" (= Ballagan Series).
- IX. *Locality*.—Left bank of Mein Water, below Johnstone Hall, two miles E. of Ecclefechan, Dumfriesshire—J. Bennie.
Horizon.—Cementstone Series (= Ballagan Series).

Algæ.

Bythotrephis, Hall.

1848. *Bythotrephis*, Hall, *Nat. Hist. of New York*, "Palæont. of New York," vol. i. p. 8.

* *Trans. Roy. Soc. Edin.*, vol. xxx. p. 531.

† In my original paper these localities were erroneously placed in the "Cementstone Series."

The genus *Bythotrephis* is now generally employed for the reception of palæozoic Algæ with simple or divided and branched fronds, the genus *Chondrites* being retained for those of similar character which occur in more recent rocks.

In the absence of any knowledge of the affinities of these fossils, this course has much to commend it.

Bythotrephis acicularis, Göppert, sp.

1852. *Confervites acicularis*, Göpp., *Foss. Flora d. Ubergangs*, p. 80, pl. xli. fig. 3.
 1850-56. *Confervites acicularis*, Sandberger, *Vers. d. Rheinischen Schichten*, p. 422 pl. xxxviii. fig. 3.
 1886. *Confervites acicularis*, Kidston, *Catal. Palæoz. Plants*, p. 21.
 1894. *Bythotrephis acicularis*, Kidston, *Proc. Roy. Phys. Soc.*, vol. xii. p. 238.

Remarks.—The true nature of this fossil is very problematical. They appear to be of vegetable origin; and though they agree well with GÖPPERT'S figure and description, they possess very little character on which to speak with certainty as to their identity.

Locality.—Glencartholm.

Bythotrephis plumosa, Kidston.

1883. *Chondrites plumosus*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 532, pl. xxx. fig. 3, pl. xxxii. fig. 2.
 1894. *Bythotrephis plumosa*, Kidston, *Proc. Roy. Phys. Soc. Edin.*, vol. xii. p. 238.

Note.—MR SEWARD has suggested that this fossil might be the fine roots of a water plant, but I rather incline to the view that it is algaloid.*

Locality.—Glencartholm.

Bythotrephis simplex, Kidston.

1883. *Chondrites simplex*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 533, pl. xxxi. fig. 14.
 1894. *Bythotrephis simplex*, Kidston, *Proc. Roy. Phys. Soc. Edin.*, vol. xii. p. 238.

Locality.—Glencartholm.

Bythotrephis Scotica, Kidston.

(Plate I. figs. 1 and 2.)

1883. *Bythotrephis*, sp., Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 534 (woodcut).
 1886. *Bythotrephis Scotica*, Kidston, *Catal. Palæoz. Plants*, p. 22.

Description.—Fronde frequently dichotomising at an acute angle, segments of frond generally contracted at point of dichotomy.

Remarks.—When preparing the Report on the Fossil Plants from Eskdale and Liddesdale† I had only imperfect specimens of this species, but of the best a woodcut was given.

* Seward, *Fossil Plants*, p. 148, 1898.

† *Trans. Roy. Soc. Edin.*, vol. xxx. p. 531, 1883.

The Geological Department of the British Museum subsequently obtained a collection of fossil plants from Glencartholm, Eskdale, and among the specimens are the two examples of *Bythotrephis Scotica* shown on Plate I. figs 1 and 2.

The larger specimen, fig. 1, most probably represents a portion of a frond from near the base. All the segments are broken, and the lower part of the fossil is also incomplete. This specimen, which is fully six inches long, illustrates well the dichotomous division of the frond. The lower part of the fossil is half an inch broad, but about three-quarters of an inch from its base it swells out considerably, and is here nine-tenths of an inch wide, but this width most probably represents the measurement of two contiguous segments; and though the fossil does not here show any line of division, in all likelihood the separation of the segments extended further down, but from their close proximity the line of separation has been obliterated through pressure. These branchlets again dichotomise, the segments becoming more narrow, till at their upper extremity, where they are broken over, they are only one-fifth of an inch broad.

In the other example, fig. 2, which is only $2\frac{1}{2}$ inches long, the length of the branchlets between the bifurcations is not so great as in the previous example, and it is possibly a portion of a frond nearer the apex.

Immediately above the base of the fragment it divides into two branches, each of which again dichotomises. These attain rather more than an inch in length, when they give rise to a third set of dichotomous segments. The branchlets which arise from a dichotomy are slightly contracted at their base, and the summit of the segment from which they spring is also constricted. In no case have I been successful in observing the termination of a segment; but from the manner in which they regularly decrease in width, there is probably only a very small portion of the upper part of this specimen wanting.

As the segments are frequently bent over each other, the alga has evidently been of a flaccid nature, but as the fossils are represented on the matrix not only by a well defined carbonaceous stain, but have a quantity of carbonaceous matter adhering to them here and there, the plant must have originally possessed considerable consistency.

My thanks are due to Dr A. SMITH WOODWARD, F.R.S., Keeper of the Department of Geology and Palæontology, British Museum, for permission to figure these specimens.

Locality.—Glencartholm.

Spirophyton, Hall.

1862. *Spirophyton*, Hall, *Contributions to Palæontology*,—16th Rept. on the Cabinet of Nat. Hist., p. 79.

Spirophyton cauda-galli, Vanuxem, sp.

1842. (*Furoides*) *cauda-galli*, Vanuxem, *Nat. Hist. of New York*, "Geol. of New York, part iii., Survey of the Third Geological District," p. 128, figs. 3 (1-2).

1863. *Spirophyton cauda-galli*, Hall, *Contributions to Palæont.*,—16th Annual Rept. on the Cabinet of Nat. Hist., pp. 79-80, figs. 1-2.

Note.—This fossil appears to be characteristic of the uppermost beds of the Calciferous Sandstone series—those in a position immediately below the Hurlet Limestone or its equivalents and the Carboniferous Limestone series.

Localities and Horizon.—River Esk, a short distance above Gilnockie Bridge, Canonbie. A little below the Gilnockie Limestones, which contain the equivalent of the Hurlet Limestone.

Liddelwater, Penton Linns, Canonbie. A little below the Penton Linns Limestones (= Gilnockie Limestones), which contain the equivalents of the Hurlet Limestone.

Filicaceæ.

Sphenopterideæ.

Calymmatotheca, Stur.

Calymmatotheca bifida, L. and H., sp.

- 1832. *Sphenopteris bifida*, L. and H., *Fossil Flora*, vol i., pl. liii.
- 1836. *Sphenopteris bifida*, Hibbert, *Trans. Roy. Soc. Edin.*, vol. xiii. p. 177, pl. vi. figs. 1-2.
- 1857. *Sphenopteris bifida*, Miller, *Testimony of the Rocks*, p. 466, fig. 129.
- 1836. *Trichomanites bifidus*, Göpp., *Syst. fil. foss.*, p. 264, pl. xv. fig. 11.
- 1884. *Calymmatotheca* (*Sphenopteris*) *bifida*, Kidston, *Quart. Journ. Geol. Soc.*, vol. xl. p. 591.
- 1886. *Calymmatotheca bifida*, Kidston, *Catal. Palæoz. Plants*, p. 68.
- 1887. *Calymmatotheca bifida*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 140, pl. viii. figs. 1-5, 6a, pl. ix. figs. 16-17.
- 1894. *Calymmatotheca bifida*, Nathorst, *Foss. Flora d. Polarländer*, Erster Theil, Erste Lief., p. 19, pl. iii. figs. 1-3.
- 1901. *Calymmatotheca bifida*, Vaffier, *Étude géol. et paléont. du Carbon Infér. du Maconnais*, p. 104, pl. i. figs. 3, 3a.
- 1860. *Gleichenites rutæfolius*, Eichwald (*non* Gutbier), *Lethæa Rossica*, vol. i. p. 90, pl. ii. figs. 5-6. (*Figures inaccurate.*)
- 1883. *Sphenopteris rutæfolia*, Schmalhausen (*non* Gutbier), *Mém. Acad. Impér. d. Sciences de St Pétersbourg*, vii^e sér., vol. xxxi. No. 13, p. 4, pl. i. figs. 1-5. (*Die Pflanzenreste der Steinkohlenformation am Ostlichen Abhange des Ural Gebirges.*)
- 1875. *Todea Lipoldi*, Stur, *Culm Flora*, Heft i. p. 71, pl. xi. fig. 8; Heft ii. p. 291.
- 1879. *Todea Lipoldi*, Schimper, in *Zittel, Handb. d. Palæont.*, ii. Abth., *Palæophytologie*, p. 107, fig. 75.
- 1876. *Sphenopteris* (*Trichomanites*) *frigida*, Heer, *Beitr. zur foss. Flora Spitzbergens*, p. 6, pl. i. figs. 1-6. (*Kongl. Svenska Vetenskaps-Akad. Handl.*, Band 14, No. 5.)
- 1883. *Staphylopteris Peachii*, Kidston (*non* Balfour), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 539, pl. xxxi. fig. 6.

Remarks.—The *Sphenopteris rutæfolia*, Eichwald (*non* Gutbier), as figured by SCHMALHAUSEN, is evidently the *Sphenopteris bifida* of LINDLEY and HUTTON. SCHMALHAUSEN also points out that the figures of *Sphenopteris rutæfolia* originally given by EICHWALD are very inaccurate, and that the plants he figures are identical with EICHWALD'S specimens.

The *Sphenopteris bifida*, Schmalhausen,* is, however, a distinct species from the *Sphenopteris bifida*, L. and H., and the name has evidently been adopted by SCHMALHAUSEN for his plant, which comes from the Permian, by an oversight.

Localities.—Glencartholm, Eskdale; Kershope Burn and Tweeden Burn, Liddesdale.

Sphenopteris, Brongniart.

Sphenopteris crassa, L. and H.

1835. *Sphenopteris crassa*, L. and H., *Fossil Flora*, vol. ii. p. 21, pl. clx.
 1883. *Sphenopteris crassa*, Kidston, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xi. p. 117, pl. iv.
 1883. *Sphenopteris crassa*, Kidston, *Proc. Roy. Phys. Soc.*, vol. vii. p. 235, pl. v.
 1869. *Adiantites crassus*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 425.
 1836. *Adiantites pachyrrachis*, Göpp., *Syst. fil. foss.*, p. 387.
 1845. *Cyclopteris pachyrrachis*, Unger, *Synop. plant. foss.*, p. 56.
 1850. *Cyclopteris adiantoides*, Unger, *Genera et species*, p. 100.
 1837. *Sphenopteris linearis*, L. and H. (non Brongt.), *Fossil Flora*, vol. iii. pl. cccxxx.
 1843. *Sphenopteris linearis*, Portlock (non Brongt.), *Rept. Geol. of Londonderry*, p. 594, pl. xxxviii. figs. 7-7a.
 1883. *Sphenopteris linearis*, Kidston (non Brongt.), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 535.
 1875. *Sphenopteris Kiowitzensis*, Stur, *Culm Flora*, Heft i. p. 32, pl. vi. fig. 8.
 1877. *Calymmatheca Kiowitzensis*, Stur, *Culm Flora*, Heft ii. p. 151.

Remarks.—Some years ago the late Mr HOWSE, Curator of the Natural History Museum, Newcastle, called my attention to the specimen figured by LINDLEY and HUTTON under the name of *Sphenopteris linearis*, Brongt.† Their specimen is not BRONGNIART'S plant, but an exceedingly fine example of the upper portion of a frond of *Sphenopteris crassa*, but the plate is not a satisfactory rendering of the fossil.

Localities.—Docken Beck, near Langholm; Glencartholm, Eskdale; and Tinnis Burn, Liddesdale.

Sphenopteris pachyrrachis, Göppert.

1852. *Sphenopteris pachyrrachis*, Göpp., *Foss. Flora d. Ubergangs*, p. 143, pl. xiii. fig. 3.
 1856. *Sphenopteris pachyrrachis*, Sandberger, *Vers. d. rhein. Schichtensyst.*, p. 428, pl. xxxix. figs. 6-7.
 1889. *Sphenopteris pachyrrachis*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxv. p. 425.
 1875. *Archæopteris pachyrrachis*, Stur, *Culm Flora*, Heft i. p. 64, pl. viii. figs. 8-9.
 1852. *Sphenopteris pachyrrachis*, var. *stenophylla*, Göpp., *Foss. Flora d. Ubergangs*, p. 143, pl. xiii. figs. 4-5.
 1869. *Sphenopteris pachyrrachis*, var. *stenophylla*, Ludwig, *Foss. Pflanzen. a. d. paläolith. Form. etc., Palæontographica*, vol. xvii. p. 119 (? pl. xxiii. figs. 2, 2a) (non pl. xxiii. fig. 3).

Remarks.—The specimen placed here is the terminal portion of a pinna. It agrees well with GÖPPERT'S figures of the var. *stenophylla*, which I believe to represent the upper portion of the frond. Reference has already been made to the difficulty of

* *Die Pflanzenreste d. Artinskischen u. Permischen Ablagerungen im Osten des Europäischen Russland*,—*Mem. du Comité géol.*, vol. ii. No. 4, p. 35, pl. ii. fig. 20, 1887.

† The *Sphenopteris linearis*, Brongt. (non Sternb.), is the *Calymmatheca affinis*, L. and H., sp.

separating fragmentary examples of the upper part of *Sphenopteris crassa*, L. and H., and *Sphenopteris pachyrrhachis*, Göpp.

I now find I was in error in formerly regarding these two species as possibly being referable to *Sphenopteridium dissectum*, Göpp., sp.

Locality.—Glencartholm, Eskdale.

Sphenopteris obovata, L. and H.

1834. *Sphenopteris obovata*, L. and H., *Fossil Flora*, vol. ii. pl. cix.

1838. *Cyclopteris obovata*, Presl, in *Sternb.*, *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 134.

1836. *Adiantites microphyllus*, Göpp., *Syst. fil. foss.*, p. 228.

1837. *Sphenopteris excelsa*, L. and H., *Fossil Flora*, vol. iii. pl. cexii.

1883. *Sphenopteris excelsa*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 537, pl. xxx. fig. 2, pl. xxxi. figs. 7-8.

Remarks.—I have referred elsewhere to the almost certain error in the locality given by LINDLEY and HUTTON for their *Sphenopteris obovata* and *Sphenopteris excelsa*.* There is almost certain evidence to show that they came from the neighbourhood of Edinburgh, and this view was strongly held by the late Mr HOWSE, Newcastle.

From the examination of many specimens I am now perfectly satisfied as to the identity of *Sphenopteris excelsa* with *Sphenopteris obovata*.

Sphenopteris obovata, L. and H., was extremely common at Glencartholm.

Locality.—Glencartholm, Eskdale.

Sphenopteris Hibberti, L. and H., var.

1836. *Sphenopteris Hibberti*, L. and H., *Fossil Flora*, vol. iii. pl. clxxvii.

1883. *Sphenopteris Hibberti*, var. Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 538, pl. xxx. fig. 1.

Remarks.—It is quite possible that the fern I have figured as *Sphenopteris Hibberti*, var., may be a form of *Sphenopteris obovata*, L. and H. I have not yet met with any specimens which could be referred with certainty to *Sphenopteris Hibberti*, L. and H., and hitherto have been unable to discover the type of the species.

Locality.—Glencartholm, Eskdale.

Sphenopteris decomposita, Kidston.

1883. *Sphenopteris decomposita*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 538, pl. xxxii. figs. 1, 1a, 4, and 5.

Locality.—Glencartholm, Eskdale.

* *Proc. Roy. Phys. Soc. Edin.*, vol. x. pp. 368 and 380, 1891.

Sphenopteris Macconochiei, Kidston.

1883. *Eremopteris Macconochiei*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 540, pl. xxxii. figs. 3, 3a.
 1894. *Sphenopteris Macconochiei*, Kidston, *Proc. Roy. Phys. Soc. Edin.*, vol. xii. p. 240.

Locality.—Glencartholm, Eskdale.

Sphenopteris, sp.

1883. *Sphenopteris Hüninghausi*, Kidston (*non* Brongt.), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 538.

Locality.—Glencartholm, Eskdale.

Rhodea, Presl.**Rhodea Machaneki**, Ettingshausen, sp.

1865. *Trichomanites Machanekii*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dawhschiefers (Denksch. d. Math. Naturwiss. Classe d. Akad. d. Wissensch.)*, vol. xxv. p. 25, fig. 12.
 1875. *Rhodea Machanekii*, Stur, *Culm Flora*, Heft i. p. 34.
 1886. *Sphenopteris Machanekii*, Kidston, *Catal. Palæoz. Plants*, p. 82.
 1883. *Sphenopteris furcata*, Kidston (*non* Brongt.), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 535.

Locality.—Glencartholm, Eskdale.

Rhacopteris, Schimper.**Rhacopteris inæquilatera**, Göpp., sp.

1860. *Cyclopteris inæquilatera*, Göpp., *Foss. Flora d. Silur. Devon. u. unter Kohlenform.*, p. 72, pl. xxxvii. figs. 6–7.
 1889. *Rhacopteris inæquilatera*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxv. p. 424.
 1861. (?) *Adiantites Lindseæformis*, Bunbury, *Geol. Survey of Gt. Brit.*, "Geology of the Neighbourhood of Edinburgh," pp. 144 and 151, fig. 26.
 1872. (?) *Adiantites Lindseæformis*, Balfour, *Introd. to Study of Palæont. Botany*, p. 41, fig. 22 bis.
 1875. *Rhacopteris flabellifera*, Stur, *Culm Flora*, Heft i. p. 76, pl. vi. fig. 10.
 1884. *Rhacopteris flabellifera*, Sterzel, ix. *Bericht d. Naturwiss. Gesell. zu Chemnitz*, p. 206, plate, fig. 1 (*Ueber d. Flora u. d. Geol. Alter. d. Kulmform. v. Chemnitz-Hainichen*).

Localities.—Glencartholm and foot of Tarras Water, Eskdale.

Rhacopteris Geikiei, Kidston, sp.

1883. *Sphenopteris Geikiei*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 535, pl. xxx. fig. 5, pl. xxxi. fig. 9.
 1886. *Rhacopteris Geikiei*, Kidston, *Catal. Palæoz. Plants*, p. 63.

Locality.—Glencartholm, Eskdale.

Neuropterideæ.

Cardiopteris, Schimper.

Cardiopteris polymorpha, Göppert, sp.

1860. *Cyclopteris polymorpha*, Göpp., *Foss. Flora d. Silur. Devon. u. unter. Kohlenform.*, p. 78, pl. xxxviii. figs. 5a-5b.
1862. *Cyclopteris polymorpha*, Schimper, *Terr. Trans. d. Vosges*, p. 339, pl. xxvii. figs. 1-7.
1873. *Cyclopteris polymorpha*, Feistmantel, *Zeitsch. d. deut. geol. Gesell.*, vol. xxv. p. 522, pl. xvi. figs. 21-23 (! fig. 24) (*Das Kohlenkalkvorkommen bei Rothwaltersdorf in der Grafschaft Glatz*).
1869. *Cardiopteris polymorpha*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 452.
1883. *Cardiopteris polymorpha*, Renault, *Cours d. botan. foss.*, vol. iii. p. 202, pl. xxxv. figs. 2-3.
1899. *Cardiopteris polymorpha*, Zeiller, *Flore foss. d. bassin houil. d'Héracleé*, p. 43, pl. iv. fig. 11 (*Mém. Soc. Géol. d. France. Paléont.*, No. 21).
1899. *Cardiopteris polymorpha*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 132, fig. 120.
1860. *Cyclopteris polymorpha*, var. *rotundifolia*, Göpp., *Foss. Flora d. Silur. Devon. u. unter. Kohlenform.*, p. 78, pl. xxxviii. figs. 6a and 6b.
1865. *Cardiopteris Hochstetteri*, Ettingshausen, *Foss. Flora d. Mähr.-Schles. Dachschiefers*, p. 21, pl. vi. fig. 3 (*Denksch. d. k. Akad. d. Wissen.*, Band xxv.).
1875. *Cardiopteris Hochstetteri*, Stur, *Culm Flora*, Heft i. p. 48, pl. xiv. fig. 2 (! fig. 3).
1866. *Cyclopteris flabellata*, Salter (non Brongt.), *Mem. Geol. Survey of Gt. Britain*, "Geol. of East Lothian," p. 73, fig. 23.
1877. *Cardiopteris*, Stur, *Culm Flora*, Heft ii. p. 288, pl. xi. fig. 6.
1884. *Cardiopteris*, Sterzel, ix. *Bericht d. Naturwiss. Gesell. zu Chemnitz*, p. 211, pl., fig. 6.
1894. *Cardiopteris*, Nathorst, *Foss. Flora d. Polarländer.*, Erst. Theil, Erst. Lief., "Palæoz. Flora d. Arktischen Zone," p. 25, pl. iii. fig. 9.
1883. *Neuropteris (Cyclopteris) trichomanoides* (!), Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 541.
1883. *Neuropteris cordata*, Kidston (non Brongt.), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 541.

Note.—The specimen originally identified as *Neuropteris cordata* is an imperfectly preserved and partially covered pinnule of *Cardiopteris polymorpha*, Göpp.

Locality.—Glencartholm, Eskdale.

Alcicornopterideæ.

Alcicornopteris, Kidston.

Alcicornopteris convoluta, Kidston.

1883. *Staphylopteris*, sp., Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 546, pl. xxxi. fig. 5.
1883. *Rhacophyllum Lactuca*, Kidston (non Presl), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 540.
1887. *Alcicornopteris convoluta*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 152, pl. viii. figs. 11-15.

Remarks.—A second species of *Alcicornopteris*—*Alcicornopteris Zeilleri*—has lately been described by VAFFIER,* who has been fortunate in discovering specimens showing the fructification attached to the ends of the branchlets. Dr VAFFIER regards the organ

* VAFFIER, *Etude géol. et paléont. du Carbonifère inférieur du Maconnais*, p. 124, pl. vi. fig. 5, pl. vii. figs. 1, 1a, 1b, 1c, 1d, 1e, 1f (*Ann. de l'Université de Lyon, Nouv. Sér.*, i. *Sciences Médecine*, fasc. 7), 1901.

which terminates the fruiting branchlets as an indusium, but judging from his figures I would be more inclined to consider the narrow segments into which the terminal structure is divided as sporangia, and not an indusium split into segments. Assuming that this sporangial interpretation is correct, the arrangement of the sporangia in *Alcicornopteris* is somewhat similar in general appearance to that of *Calymmatotheca*, but the synangia are considerably larger than any known *Calymmatothecous* synangia. In Dr VAFFIER's figures the sporangial stalk expands at its summit and forms a saucer-shaped disc, from the margins of which—according to my interpretation of the structure—spring the narrow lanceolate sporangia, which are rather more than a quarter of an inch long. It is probable that the saucer-like expansion to which the sporangia seem to be attached is partially formed by their united bases.

It is a remarkable circumstance that though in a few localities the fruiting branches of *Alcicornopteris convoluta* are comparatively common, no trace of the fructification has ever been found, nor is there even any remains of the saucer-like base of the fructification attached to the branchlets. It would appear, then, that the whole structure became attached after maturity.

Localities.—Archerbeck, Canonbie; Docken Beck, Eskdale.

Eskdalia, Kidston, n.g.

Stems with smooth cortex bearing slightly distant, spirally arranged oval scars, with the vascular cicatrice placed towards the upper part of the scar. In the sub-epidermal condition the scar shows a central oval band occupying about a third of the area of the scar.

Remarks.—This genus is founded for the reception of the fossil I originally described as *Caulopteris minuta*, but the discovery of better preserved specimens has shown that it cannot be retained in the genus *Caulopteris*.

Eskdalia minuta, Kidston.

(Plate I. figs. 4–8.)

1883. *Caulopteris minuta*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 541, pl. xxxi. figs. 1, 1a.

Description.—Stem with smooth cortex bearing egg-shaped scars with slight lateral angles; rounded base and with narrower rounded apex having a small notch; immediately below the notch is a small circular scar. The vascular bundle appears as a narrow elongated ridge, placed about two-thirds above the base. On the young condition of the stem the scars are oval, and terminate a very slight elevation of the cortex. Specimens with the epidermal layer removed show in the scar a central oval band.

Remarks.—On the specimen I originally described the epidermal layer was removed

from all the scars, and in this condition they show a central oval ring. On the scar figured in the earlier description* the ring shows a small notch at the summit, but as this is not a constant character, its occurrence may have been accidental.

On Plate I. of the present communication several small figures are given, which illustrate more fully the structure of this plant. Fig. 4 shows a small fragment of the cortex, natural size; at fig. 5 one of the scars is given, enlarged about two times, which shows the lateral angles and the small notch at the apex, immediately below which is a small circular point; this is better seen at the further enlarged fig. 6. Fig. 7 gives an outline sketch of a young stem, natural size, and one of the scars is enlarged at fig. 8. The lateral angles and notch are not observable here, but the scars are only 1 mm. long. On the specimen shown at fig. 4 the scars are 5 mm. long. The stems show no trace of aerial rootlets.

I think *Eskdalia* is probably a fern stem, but on this point I do not speak with any certainty.

Locality.—Glencartholm; and Kershope Burn, Liddesdale.

Equisetaceæ.

Asterocalamites, Schimper.

Asterocalamites scrobiculatus, Schlotheim, sp.

- 1820. *Calamites scrobiculatus*, Schlotheim, *Petrefactenkunde*, p. 402, pl. xx. fig. 4.
- 1826. *Bornia scrobiculata*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xxviii.
- 1843. *Bornia scrobiculata*, Roemer, *Vers. d. Harzgebirges*, p. 1, pl. i. fig. 4.
- 1852. *Bornia scrobiculata*, Göpp., *Foss. Flora d. Ubergangs*, p. 131, pl. x. figs. 1-2.
- 1854. *Bornia scrobiculata*, Römer, *Palæont.*, vol. iii. p. 45, pl. vii. fig. 5.
- 1869. *Bornia scrobiculata*, Ludwig, *Palæont.*, vol. xvii. p. 116, pl. xxi. figs. 1, 1a, 2, 2a.
- 1880. *Asterocalamites scrobiculatus*, Zeiller, *Végét. foss. du terr. houil.*, p. 17, pl. elix. fig. 2.
- 1899. *Asterocalamites scrobiculatus*, Zeiller, *Flore foss. du bassin houil. d'Héracle*, p. 58, pl. v. fig. 1.
- 1899. *Asterocalamites scrobiculatus*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 184, fig. 178.
- 1900. *Asterocalamites scrobiculatus*, Zeiller, *Éléments de paléobot.*, p. 159, fig. 112.
- 1901. *Asterocalamites scrobiculatus*, Vaffier, *Étude géol. et paléont. du Carbonifère inférieur du Maconnais*, p. 125, pl. viii. figs. 1, 1a, 1b, 1c, 1d.
- 1901. *Asterocalamites scrobiculatus*, Potonié, *Silur- und die Culm-Flora des Harzes u. des Magdeburgischen*, p. 86, figs. 46-51.
- 1898. *Archæocalamites scrobiculatus*, Seward, *Fossil Plants*, p. 386, fig. 103, p. 385.
- 1828. *Calamites radiatus*, Brongt., *Prodrôme*, p. 37.
- 1828. *Calamites radiatus*, Brongt., *Hist. d. végét. foss.*, p. 122, pl. xxvi. figs. 1-2.
- 1880. *Calamites radiatus*, Rothpletz, *Flora u. Fauna d. Culmform. bei Hainichen in Sachsen*,—*Botan. Centralblatt*, p. 4, pl. i. figs. 1-5.
- 1833. *Equisetites radiatus*, Sternb., *Essai flore monde prim.*, vol. ii. fasc. 5-6, p. 46.
- 1862. *Calamites (Asterocalamites) radiatus*, Schimper, *Le terr. de Transition d. Vosges*, p. 321, pl. i.
- 1899. *Calamites (Asterocalamites) radiatus*, Hofmann and Ryba, *Leitpflanzen*, p. 23, pl. i. figs. 3-4.
- 1869. *Bornia radiata*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 335, pl. xxiv. figs. 1-9 (non fig. 10).

* *Trans. Roy. Soc. Edin.*, vol. xxx., pl. xxxi. fig. 1a.

1877. *Bornia radiata*, Schmalhausen, *Ein fernerer Beitrag. z. Kenntniss d. Ursstufe Ost-Sibiriens. Mèlang. Phys. et Chim.*, vol. x. p. 738, pl. i. fig. 1 (? figs. 2, 3).
1896. *Bornia radiata*, Renault, *Bassin houil. et perm. d'Autun et d'Épinac. Flore foss.*, deux. part., p. 81, pl. xlii. figs. 2-4 (? fig. 1).
1875. *Archæocalamites radiatus*, Stur, *Culm Flora*, Heft i. p. 2, pl. i. figs. 3-8, pl. ii., pl. iii., pl. iv., pl. v. figs. 1-2; Heft ii. p. 180, pl. xix. figs. 1-6, pl. xx. figs. 1-2, pl. xxi. figs. 1, 1b, pl. xxii. fig. 1, 1877.
1880. *Archæocalamites radiatus*, Schimper, in Zittel, *Handb. d. Palæont.*, ii. Abth., *Palæophytologie*, p. 175, figs. 132-133.
1888. *Archæocalamites radiatus*, Toula, *Die Steinkohlen*, p. 203, pl. v. figs. 7 and 10.
1896. *Archæocalamites radiatus*, Solms-Laubach, *Abhandl. d. k. Preuss. Geol. Landesanstalt. Neue Folge*, Heft 23, p. 79, pl. v. figs. 1-2 (Ueber die zeinerzeit von Unger beschriebenen structurbietenden Pflanzenreste des Unterculm von Saalfeld in Thüringen).
1900. *Archæocalamites radiatus*, Scott, *Studies in Fossil Botany*, p. 65, figs. 28-29.
1852. *Calamites transitionis*, Göpp., *Foss. Flora d. Übergangs*, p. 116, pl. iii., pl. iv., and pl. xxxviii.
1853. *Calamites transitionis*, Geinitz, *Vers. d. Grauwackenform.*, part ii. p. 82, pl. xviii. figs. 6-7.
1854. *Calamites transitionis*, Geinitz, *Darstell. d. Flora d. Hainich-Ebersdorfer*, p. 30, pl. i. figs. 2-7.
1854. *Calamites transitionis*, Römer, *Beitr. z. geol. Kenntniss. d. nord-west. Harzgebirges*, p. 45, pl. vii. fig. 4.
- 1850-55. *Calamites transitionis*, Sandberger, *Vers. d. Rhein. Schicht. in Nassau*, p. 426, pl. xxxix. figs. 1, 1a.
1860. *Calamites transitionis*, Eichwald, *Lethæa Rossica*, vol. i. p. 166, pl. xiii. figs. 1-2.
1864. *Calamites transitionis*, Richter (pars), *Der Kulm. in Thüringen. Zeitsch. d. Deut. geol. Gesell.*, vol. xvi. p. 166, pl. v. figs. 7-8, pl. vi. figs. 1 (? 2), 3, 4.
1865. *Calamites transitionis*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dachschiefers.*, p. 10, pl. i. fig. 4, pl. ii., pl. iii. figs. 2-5, pl. iv. figs. 1, 3, 4, and fig. p. 11.
1868. *Calamites transitionis*, Dawson, *Acad. Geol.*, 2nd ed., p. 536, fig. 186.
1869. *Calamites transitionis*, Ludwig, *Foss. Pflanzenreste a. d. palæolithischen Formationen, etc., Palæont.*, vol. xvii. p. 115, pl. xxi. figs. 4, 4a, 4b, 4c, 4d, 4e.
1870. *Calamites transitionis*, Römer, *Geol. v. Oberschlesien*, p. 54, pl. iv. figs. 1-3.
1873. *Calamites transitionis*, Feistmantel, *Kohlenkalkvorkommen bei Rothwaltersdorf in der Grafschaft Glatz., etc. (Zeitsch. d. deut. geol. Gesell., vol. xxv.)*, p. 491, pl. xiv. figs. 3-4.
1854. *Bornia transitionis*, Roemer, *Palæont.*, vol. iii. p. 45, pl. vii. fig. 7.
1852. *Calamites variolatus*, Göpp., *Foss. Flora d. Übergangs*, p. 124, pl. v.
1852. *Stigmatocanna Volkmanniana*, Göpp., *Foss. Flora d. Übergangs*, p. 126, pl. viii. pl. ix.
1852. *Bornia Jordaniana*, Göpp., *Foss. Flora d. Übergangs*, p. 132, pl. x. fig. 3.
1860. *Calamites Sternbergii*, Eichwald, *Lethæa Rossica*, vol. i. p. 172, pl. xiv. fig. 3.
1862. *Calamites inornatus*, Dawson, *Flora of the Devonian Period in N.-E. America, Quart. Journ. Geol. Soc.*, vol. xviii. p. 310, pl. xvii. fig. 56.
1869. *Bornia inornata*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 336.
1865. *Calamites laticostatus*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dachschiefers*, p. 12, pl. iii. fig. 1.
1869. *Bornia laticostata*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 336.
1865. (?) *Calamites tenuissimus*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dachschiefers*, p. 16, p. 17, fig. 2, pl. i. figs. 1-2
1843. *Calamites cannaformis*, Roemer (non Schlotheim), *Vers. d. Harzgebirges*, p. 2, pl. i. fig. 7.

Foliage :—

1852. *Asterophyllites elegans*, Göpp., *Foss. Flora d. Übergangs*, p. 133, pl. vi. fig. 11.
1854. *Sphenophyllum furcatum*, Geinitz, *Darstell. d. Flora d. Hainichen-Ebersdorfer*, p. 36, pl. i. figs. 10-12, pl. ii. figs. 1-2.
1869. *Asterophyllum furcatum*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 345.
1865. *Schizæa transitionis*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dachschiefers*, p. 27, pl. vii. fig. 5.

1873. *Schizæa transitionis*, Feismantel, *Kohlenkalkvorkommen bei Rothwaltersdorf, etc.*, p. 519, pl. xv. fig. 19 (*Zeitsch. d. deut. geol. Gesell.*, vol. xxv.).
 1860. *Schizopteris Lactuca*, Göpp. (non Presl.), *Foss. Flora d. Silur. Devon. u. unter. Kohlenform.*, p. 79, pl. xxxviii. figs. 7-8.
 1865. *Schizopteris Lartuca*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dachschiefers*, p. 29, fig. 15.
 1873. (?) *Asterophyllites equisetiformis*, Feismantel (non Schlotheim), *Kohlenkalkvorkommen bei Rothwaltersdorf, etc.*, p. 498, pl. xiv. fig. 6.

Fructification :—

1841. *Pothocites Grantoni*, Paterson, *Trans. Bot. Soc. Edin.*, vol. i. p. 45, pl. iii.
 1872. *Pothocites Grantoni*, Balfour, *Intro. to Study of Palæontol. Botany*, p. 67, fig. 54.
 1883. *Pothocites Grantoni*, Kidston, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xi. p. 300, pl. ix. figs. 1-5.
 1874. *Pothocites Patersoni*, R. Etheridge, jr., *Trans. Bot. Soc. Edin.*, vol. xii. p. 151.
 1883. *Pothocites Patersoni*, Kidston, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xi. p. 302, pl. x. figs. 6, 7, 8, pl. xi. figs. 9, 10, pl. xii. fig. 14.
 1883. *Pothocites Patersoni*, Williamson, *Proc. Roy. Institution of Gt. Brit.*, vol. x. part ii. p. 299, fig. 9.
 1882. *Pothocites calamitoides*, Kidston, *Ann. and Mag. Nat. Hist.*, vol. x. p. 404.
 1883. *Pothocites calamitoides*, Kidston, *Ann. and Mag. Nat. Hist.*, 5 ser., vol. xi. p. 305, pl. xii. figs. 13, 15, 16, 17.
 1883. *Pothocites*, sp., Kidston, *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xi. p. 304, pl. x. fig. 8.
 1883. *Bornia radiata*, Kidston, *Trans. Bot. Soc. Edin.*, vol. xvi. p. 37, pl. i. figs. 1-5, pl. ii. figs. 6-8, pl. iii. figs. 9-10, pl. iv. figs. 13-17.
 1873. *Asterophyllites spaniophyllus*, Feismantel, *Kohlenkalkvorkommen bei Rothwaltersdorf, etc.*, p. 498, pl. xiv. fig. 5.

Note.—The most perfect specimen of the cone of *Asterocalamites scrobiculatus*, Schlotheim, sp., yet discovered, was collected by Mr T. Stock at Glencartholm. It was to this specimen I applied the name of *Pothocites calamitoides* before I recognised the identity of the specimen with the *Pothocites Grantoni*, Paterson.

Locality.—Glencartholm, Eskdale.

Volkmannia, Sternberg.

Volkmannia, sp.

Locality.—Glencartholm, Eskdale.

Pinnularia, Lindley and Hutton.

Pinnularia, sp.

Locality.—Left bank of Mein Water, two miles N.E. of Ecclefechan. Collected by Mr J. BENNIE.

Lycopodiaceæ.

Lepidodendron, Sternberg.

Lepidodendron Veltheimii, Sternberg.

1820. "Schuppenpflanze," Rhode, *Beitr. z. Pflanz. d. Vorwelt*, p. 16, pl. iii.
1823. "Vegetable Impression," Allan, *Trans. Roy. Soc. Edin.*, vol. ix. p. 235, pl. xiv.
1826. *Lepidodendron Veltheimii*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. 48, pl. lii. fig. 3.
1886. *Lepidodendron Veltheimii*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 451, pl. lxvii. fig. 2.
1899. *Lepidodendron Veltheimii*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 222, fig. 217.
1901. *Lepidodendron Veltheimii*, Potonié, *Silur- u. d. Culm-Flora d. Harzes u. d. Magdeburgischen*, p. 116, figs. 72, 73, 74, 75A, 75B, 76.
1826. *Lepidodendron Veltheimianum*, Sternb., *Essai Flore monde prim.*, vol. i. fasc. 4. p. xii.
1865. *Lepidodendron Veltheimianum*, Heer (*pars*), *Urwelt Schweiz*, p. 7, fig. 2a, 2b.
1874. *Lepidodendron Veltheimianum*, Heer, *Beitr. z. Steinkohlen Flora d. Artischen Zone*, p. 4, pl. iv., pl. v. fig. 3.
1875. *Lepidodendron Veltheimianum*, Stur (*pars*), *Culm Flora*, Heft i. p. 79, Heft ii. (1877) p. 375, pl. xxxv. figs. 2-3, pl. xxxvi. figs. 5-6 (*non* figs. 8-10), pl. xxxvii. figs. 1-6, pl. xxxviii., pl. xxxix., figs. 3a, 3b (*non* figs. 1-2).
1882. *Lepidodendron Veltheimianum*, Renault (*pars*), *Cours d. botan. foss.*, vol. ii. p. 9, pl. v. fig. 1.
1885. *Lepidodendron Veltheimianum*, Kidston (*pars*), *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xvi. p. 243, pl. iii., pl. iv. fig. 2 (*non* figs. 3-4), pl. iv. figs. 11, 11a, 11b.
1888. *Lepidodendron Veltheimianum*, Toulou (*pars*), *Die Steinkohlen*, pp. 195, 196, 198, pl. iii. figs. 2, 7, 12, 15.
1899. *Lepidodendron Veltheimianum*, Hofmann and Ryba, *Leitpflanzen*, p. 79, pl. xv. figs. 7-9.
1900. *Lepidodendron Veltheimianum*, Scott, *Studies in Fossil Botany*, p. 120, fig. 49.
1902. *Lepidodendron Veltheimianum*, Kidston, *Proc. York. Geol. and Polytech. Soc.*, vol. xiv. part iii. pp. 347, 381, 383, pl. lvi. fig. 1, pl. lvii. fig. 1.
- ? . . *Lepidodendron Veltheimianum*, König, *Icones fossilium sectiles*, pl. xviii. fig. 236.
1828. *Stigmaria* (?) *Veltheimiana*, Brongt., *Prodrome*, p. 88.
1838. *Sagenaria Veltheimiana*, Presl., in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 180, pl. lxviii. fig. 14.
1852. *Sagenaria Veltheimiana*, Göpp. (*pars*), *Foss. Flora d. Übergangs*, p. 180, pl. xviii., pl. xix., pl. xxiii. figs. 1-3, pl. xxiv., pl. xliii. fig. 1.
1854. *Sagenaria Veltheimiana*, Geinitz, *Darstell. d. Flora d. Hainichen-Ebersdorfer u. d. Floehaer Kohlenbassins*, p. 51, pl. iv., pl. v., pl. vi. figs. 1, 1a (*non* figs. 2-3).
1854. *Sagenaria Veltheimiana*, Roemer, *Palæont.*, vol. iii. p. 46, pl. vii. fig. 14.
1860. *Sagenaria Veltheimiana*, Eichwald, *Lethæa Rossica*, vol. i. p. 119, pl. vii. figs. 2-6.
1862. *Sagenaria Veltheimiana*, Schimper, *Terr. d. transition d. Vosges*, p. 337, pl. xxi., pl. xxii., pl. xxiii., pl. xxiv., pl. xxv.
1862. *Sagenaria Veltheimiana*, Roemer, *Palæont.*, vol. ix. p. 10, pl. iii. fig. 6.
1873. *Sagenaria Veltheimiana*, Feistmantel, *Das Kohlenkalkvorkommen bei Rothwaltersdorf in der Grafschaft Glatz. (Zeitsch. d. deut. geol. Gesell.*, vol. xxv.), p. 529, pl. xvii. figs. 31-32.
1826. *Lepidodendron ornatissimum*, Sternb. (*pars*), *Essai flore monde prim.*, vol. i. fasc. 4, p. xii.
1837. *Lepidodendron ornatissimum*, Brongt., *Hist. d. végét. foss.*, vol. ii. pp. 70, 72, pl. xviii.
1837. *Selaginites patens*, Brongt., *Hist. d. végét. foss.*, vol. ii. p. 68, pl. xxvi.
1870. *Lepidodendron patens*, Schimper, *Traité d. paléont. végét.*, vol. ii. p. 36.
1837. *Ulodendron Rhodii*, Buckland, *Geol. and Mineral.*, vol. ii. p. 93, pl. lvi. fig. 6.
1837. *Ulodendron Allanii*, Buckland, *Geol. and Mineral.*, vol. ii. p. 92, pl. lvi. fig. 3.
1838. *Ulodendron Rhodeanum*, Presl., in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 186.

1838. *Ulodendron ellipticum*, Presl, in *Sternb., Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 186, pl. xlv. fig. 2.
1854. *Sagenaria caudata*, Geinitz (*non* Presl), *Darst. d. Flora d. Hainichen-Ebersdorfer*, p. 53, pl. vi. fig. 4.
1862. *Sagenaria caudata*, Roemer (*non* Presl), *Beitr. z. geol. Kenntniss d. nordw. Harzgebirges*, p. 9, pl. iii. fig. 5.
1854. *Sagenaria geniculata*, Roemer, *Palæont.*, vol. iii. p. 46, pl. vii. fig. 13.
1870. *Lipidodendron geniculatum*, Schimper, *Traité d. paléont. végét.*, vol. ii. p. 33.
1860. *Sagenaria confluens*, Eichwald, *Lethæa Rossica*, p. 121, pl. vii. fig. 1.
1860. *Sagenaria aculeata*, Göpp. (*non* Sternberg), *Foss. Flora d. Silur. Devon. u. unter Kohlenform.*, p. 95, pl. xxxix., pl. xl. figs. 1-3, pl. xli. fig. 1.
1873. *Sagenaria aculeata*, Feistmantel (*non* Sternberg), *Zeitsch. d. deut. geol. Gesell.*, vol. xxv. p. 531, pl. xvii. fig. 33.
1869. *Sagenaria elliptica*, Ludwig (*non* Göppert), *Palæont.*, vol. xvii. p. 122, pl. xxvi. figs. 1a, 1b, 1c, 1d.
1870. *Ulodendron commutatum*, Schimper, *Traité d. paléont. végét.*, vol. ii. p. 40, pl. lxiii.
1870. *Ulodendron parmatum*, Carr. (*non* Steinhauer), *Monthly Mic. Journ.*, p. 152, pl. xlv. fig. 4.
1870. *Ulodendron ovale*, Carr., *Monthly Mic. Journ.*, p. 152, pl. xlv. fig. 1.
1876. *Lepidodendron Sternbergii*, Heer (*pars*) (*non* Brongt.), *Beitr. z. Foss. Flora Spitzbergens*, p. 11, pl. iii. figs. 1, 2, 5-18, 20, pl. iv. figs. 3-4.
1876. *Lepidodendron selaginoides*, Heer (*non* Sternberg), *Beitr. z. Foss. Flora Spitzbergens*, p. 14, pl. iii. fig. 21.
1880. *Ulodendron minus*, Thomson (*non* L. and H.), *Trans. Edin. Geol. Soc.*, vol. iii. p. 341, pl. (i.) figs. 2-3.
1882. *Ulodendron majus*, Weiss (*non* L. and H.), *Aus d. Steink.*, p. 9, pl. vi. fig. 37 (zweiter abdr.).

Note.—Not common.

Locality.—Glencartholm, Eskdale.

Bothrodendron, Lindley and Hutton.

Bothrodendron Wükianum, Kidston.

1889. *Bothrodendron Wükianum*, Kidston (*pars*), *Ann. and Mag. Nat. Hist.*, ser. 6, vol. iv. p. 65, pl. iv. figs. 3-4.
1889. *Bothrodendron Wükianum*, Kidston (*pars*), *Proc. Roy. Phys. Soc. Edin.*, vol. x. p. 94, pl. iv. figs. 3, 4.
1893. *Sagillaria* (*Bothrodendron*) *Wükianum*, Weiss, *Die Sigillarien d. preuss. Steink.-u.-Rothl. Gebiete.*, ii. Gruppe, *Die Subsagillarien*, p. 57, pl. xxviii. figs. 111-112 (*Abhandl. d. König. Preuss. geol. Landesanstalt. Neue Folge, Heft 2*).

Note.—For remarks on this and the following species, see notes under *Bothrodendron Kidstoni*, Weiss, p. 823.

Locality.—Left bank of Mein Water, two miles N.E. of Ecclefechan. Collected by Mr J. BENNIE.

Bothrodendron Kidstoni, Weiss.

1889. *Bothrodendron Wükianum*, Kidston (*pars*), *Ann. and Mag. Nat. Hist.*, ser. 6, vol. iv. p. 65, pl. iv. fig. 2.
1889. *Bothrodendron Wükianum*, Kidston (*pars*), *Proc. Roy. Phys. Soc. Edin.*, vol. x. p. 94, pl. iv. fig. 2.

1893. *Sigillaria (Bothrodendron) Kidstoni*, Weiss, *Die Sigillarien d. preuss. Steink.-u.-Rothl. Gebiete*, ii. Gruppe, *Die Subsigillarien*, p. 56, pl. xxviii. fig. 110.

Locality.—Left bank of Mein Water, two miles N.E. of Ecclefechan. Collected by Mr J. BENNIE.

Lepidophyllum, Brongniart.

Lepidophyllum lanceolatum, L. and H.

1831. *Lepidophyllum lanceolatum*, L. and H., *Fossil Flora*, vol. i. pl. vii. figs. 3–4.
 1855. *Lepidophyllum lanceolatum*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 50, pl. ii. fig. 8.
 1858. *Lepidophyllum lanceolatum*, Lesqx., in Rogers, *Geol. of Pennsylv.*, vol. ii. part ii. p. 875, pl. xvii. fig. 1.
 1869. *Lepidophyllum lanceolatum*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 141, pl. xxviii. fig. 10.
 1879. *Lepidophyllum lanceolatum*, Lesqx., *Atlas to Coal Flora*, p. 14, pl. lxix. fig. 38.
 1886. *Lepidophyllum lanceolatum*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 505, pl. lxxvii. figs. 7–8.
 1899. *Lepidophyllum lanceolatum*, Zeiller, *Étude sur la flore foss. du bassin houil d'Héraclée*, p. 50, fig. 11, p. 75.
 1900. *Lepidophyllum lanceolatum*, Zeiller, *Éléments de paléobot.*, p. 187, fig. 129.
 1880. *Lepidostrobus lanceolatus*, Lesqx., *Coal Flora*, p. 436.
 1890. *Lepidostrobus lanceolatus*, Kidston, *Trans. York. Nat. Union*, part xiv. p. 50.
 1855. *Sagenaria dichotoma*, Geinitz (*pars*) (*non* Sternberg), *Vers. d. Steinkf. in Sachsen*, p. 34, pl. ii. figs. 6–8.
 1855. *Lepidostrobus lepidophyllaceus*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 50, pl. ii. figs. 6–7.
 1899. *Lepidostrobus variabilis*, Hofmann and Ryba (*pars*) (*non* L. and H.), *Leitpflanz.*, p. 86, pl. xvi. fig. 6.

Localities.—Glencartholm, Eskdale; and Tweeden Burn, Liddesdale.

Lepidostrobus, Brongniart.

Lepidostrobus variabilis, L. and H.

1831. *Lepidostrobus variabilis*, L. and H., *Fossil Flora*, vol. i. pl. x. pl. xi. (*figure to right only*).
 1870. *Lepidostrobus variabilis*, Schimper (*pars*), *Traité d. paléont. végét.*, vol. ii. p. 61, pl. lviii. fig. 2a and fig. 5.
 1838. *Lepidostrobus*, Brongt., *Hist. d. végét. foss.*, vol. ii., pl. xxii. figs. 5–7.

Remarks.—A very ill defined species, in which are placed a certain type of cone belonging most certainly to several species. I believe that the *Lepidostrobus ornatus*, Brongt.,* only represents a state of preservation of cones which as ordinary impressions would find a place under *Lepidostrobus variabilis*, L. and H.

Localities.—Saughtree, Liddesdale; Glencartholm, Eskdale.

Lepidostrobus fimbriatus, Kidston.

1883. *Lepidostrobus fimbriatus*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 543, pl. xxxi. figs. 2–4.

Localities.—Glencartholm, Eskdale; Tweeden Burn, Liddesdale.

* BRONGNIART, *Prodrome*, p. 87.

Stigmaria, Brongniart.

Stigmaria ficoides, Sternberg, sp.

1720. *Lithophyllum*, Volkmann, *Silesia subterranea*, p. 106, pl. xi. fig. 1, add. pl. iv. fig. 9.
1793. Ure, *History of Rutherglen and East Kilbride*, p. 301, pl. xiii. figs. 2 and 7.
1804. Parkinson, *Organic Remains*, vol. i., pl. iii. fig. 1.
1809. *Phytolithus plantites*, Martin, *Petrificata Derbiensia*, pl. xi., pl. xii., pl. xii*.
1820. *Pulmarites verucosus*, Schlotheim, *Petrefactenkunde*, p. 349, pl. xv. fig. 4.
1820. *Variolaria ficoides*, Sternb., *Essai flore monde prim.*, vol. i. fasc. i. pp. 23, 26, pl. xii. figs. 1-3.
1822. *Phytolithus verrucosus*, Parkinson, *Outlines of Oryctology*, p. 11, pl. i. figs. 1-2.
1825. *Ficoidites furcatus*, Artis, *Antedil. Phyt.*, pls. iii. iii.bis.
1825. *Ficoidites verrucosus*, Artis, *Antedil. Phyt.*, pl. x.
1825. *Ficoidites major*, Artis, *Antedil. Phyt.*, pl. xviii.
1828. *Stigmaria ficoides*, Brongt., *Class. d. végét. foss.*, pp. 28 and 89, pl. i. fig. 7.
1832. *Stigmaria ficoides*, L. and H., *Fossil Flora*, vol. i. pls. xxxi.-xxxvi.; vol. iii., pl. clxvi. (1835).
1836. *Stigmaria ficoides*, Göpp., *Syst. fil. foss.*, p. 92, pl. xxxiii. fig. 7 (var.).
1837. *Stigmaria ficoides*, Buckland, *Geol. and Mineral.*, vol. i. p. 476; vol. ii., pl. lvi. figs. 8-11.
1839. *Stigmaria ficoides*, Brongt., "Observ. sur la structure intérieure du Sigillaria elegans comparée à celle des Lepidodendron et des Stigmaria," p. 426, pl. v. (xxix.), (*Archives du Mus. d'hist. nat.*, vol. i., Paris).
1841. *Stigmaria ficoides*, Göpp., *Gatt. d. foss. Pflanzen.*, Lief. 1-2, p. 13, pls. viii.-xv. (? pl. xvi.) (includes vars.).
1845. *Stigmaria ficoides*, Corda (pars), *Flora d. Vorwelt*, p. 32, pl. xii.
1848. *Stigmaria ficoides*, Hooker, *Mem. Geol. Survey of Gt. Brit.*, vol. ii. part ii. p. 431, pl. i. figs. 1-3, pl. ii. figs. 1-14.
1848. *Stigmaria ficoides*, Sauveur, *Végét. foss. d. terr. houil. de la Belgique*, pl. lxv. fig. 1.
1851. *Stigmaria ficoides*, Göpp. (pars), *Zeitsch. d. deut. geol. Gesell.*, vol. iii. p. 278, pl. xi. fig. 6, pl. xiii. figs. 7-9.
1852. *Stigmaria ficoides*, Göpp., *Foss. Flora d. Ubergangs*, p. 245, pl. xxxii. (vars.).
1852. *Stigmaria ficoides*, Bronn, *Lethæa Geog.*, vol. i. p. 137, pl. vi. figs. 13-15, pl. vii. fig. 7.
1854. *Stigmaria ficoides*, Geinitz, *Darst. d. Flora d. Hainichen-Ebersdorfer*, p. 59, pl. xi. figs. 1-2.
1855. *Stigmaria ficoides*, Goldenberg (pars), *Flora Sarap. foss.*, Heft i. p. 36, pl. B. figs. 26-28, Heft iii. (1862) p. 17, pl. xiii. fig. 1.
1858. *Stigmaria ficoides*, Binney, *Quart. Journ. Geol. Soc.*, vol. xv. p. 76, pl. iv.
1862. *Stigmaria ficoides*, Roemer, *Palæontographica*, vol. ix. p. 10, pl. iii. fig. 7.
1862. *Stigmaria ficoides*, Schimper (pars), *Terr. d. transition d. Vosges*, p. 324, pl. ii., pl. iii., pl. v., pl. viii. (includes vars.).
1865. *Stigmaria ficoides*, Dawson, *Quart. Journ. Geol. Soc.*, vol. xxii. p. 148, pl. xii. figs. 83-85 (vars.).
1868. *Stigmaria ficoides*, Ebray, *Végét. foss. d. terr. d. transition d. Beaujolais*, p. 17, pls. i.-iv., pl. v. (upper fig.).
1869. *Stigmaria ficoides*, Roehl (pars), *Foss. Flora d. Steink-Form. Westph.*, p. 119, pl. xxv.
1870. *Stigmaria ficoides*, Schimper, *Traité d. paléont. végét.*, vol. ii. p. 114, pl. lxix. (includes vars.).
1871. *Stigmaria ficoides*, Heer (pars), *Foss. Flora d. Bären. Insel.*, p. 45, pl. viii. fig. 5c, pl. ix. fig. 5a, pl. xii. figs. 1-4, 6.
1872. *Stigmaria ficoides*, Balfour, *Introd. to Study of Palæontological Bot.*, p. 47, figs. 38-39, pl. iii. figs. 7-9.
1873. *Stigmaria ficoides*, Feistmantel, *Zeitsch. d. deut. Geol. Gesell.*, vol. xxv. p. 535, pl. xvii. fig. 37.
1874. *Stigmaria ficoides*, Heer, *Steinkf. d. Artischen Zone*, p. 5, pl. i. fig. 4, pl. ii., pl. iii.
1875. *Stigmaria ficoides*, Binney, *Palæont. Soc.*, pp. 139, 143, pl. xxi., pl. xxiv. ("Obser. Struct. Foss. Plants," part iv.).
1876. *Stigmaria ficoides*, Heer, *Foss. Flora Helv.*, p. 43, pl. xvi. fig. 9 (var. *vulgaris*).

1879. *Stigmaria ficoides*, Lesqx. (pars), *Coal Flora*, p. 514, pl. lxxiv. figs. 1-4, 8, 10, 11 (includes vars.).
1880. *Stigmaria ficoides*, Schimper, in Zittel, *Handb. d. Palæont.*, ii. Abth., *Palæophyt.*, p. 207, fig. 157.
1880. *Stigmaria ficoides*, Zeiller, *Végét. foss. d. terr. houil.*, p. 140, pl. clxxiii. fig. 4 (includes vars.).
1881. *Stigmaria ficoides*, Renault, *Cours d. botan. foss.*, vol. i. p. 155, pl. xix. figs. 7-8 (includes var.).
1882. *Stigmaria ficoides*, Weiss, *Aus d. Steink.*, p. 9, pl. vi. fig. 40 (zweiter abdr.).
1883. *Stigmaria ficoides*, Schmallhausen, *Bull. Akad. Impér. Sc. St Pétersbourg*, vii^e sér., vol. xxxi. p. 17, pl. iv. figs. 9-12.
1884. *Stigmaria ficoides*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist.* 13th Ann. Rept., part ii., *Palæont.*, p. 95, pl. xix. figs. 1-2 (includes var.).
1886. *Stigmaria ficoides*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 611, pl. xci. figs. 1-6 (includes var.).
1887. *Stigmaria ficoides*, Williamson, *Morph. and Histol. of Stigmaria ficoides*, *Palæont. Soc.*, pp. i.-iv. 1-62, pls. i.-xv. (text figs.) (excl. pl. xiii. figs. 71 and 78).
1888. *Stigmaria ficoides*, Toula, *Die Steinkohlen*, p. 199, pl. iv. figs. 2-5 (includes var.).
1888. *Stigmaria ficoides*, Schenk, *Die foss. Pflanzenreste*, p. 91, figs. 48-50.
1890. *Stigmaria ficoides*, Renault, *Flore foss. terr. houil. d. Commeny*, deux. part., p. 552, pl. lxi. fig. 7, pl. lxii. figs. 1-4.
1891. *Stigmaria ficoides*, Solms-Laubach, *Fossil Bot.*, p. 263, figs. 30-37a, 37b.
1893. *Stigmaria ficoides*, Sterzel, *Die Flora des Rothl. im Plauenschen Grunde bei Dresden*, p. 105, pl. x. fig. 3.
1894. *Stigmaria ficoides*, Nathorst, *Zur foss. Flora d. Polarländer*, Erst. Theil, Erst. Lief., *Zur Palæozoischen Flora d. Arktischen Zone*, p. 43, pl. viii. fig. 9, and pp. 44 (var. *minima*), 71.
1899. *Stigmaria ficoides*, Hofmann and Ryba, *Leitpflanzen*, p. 97, pl. xix. figs. 1-3, pl. xx. figs. 1-2.
1900. *Stigmaria ficoides*, Scott, *Studies in Fossil Botany*, p. 217, figs. 82-89.
1900. *Stigmaria ficoides*, Zeiller, *Éléments de Paléobotanique*, p. 200, fig. 139.
1901. *Stigmaria ficoides*, Vaffier, *Étude géol. et paléont. d. Carbon inférieur des Maconnais*, p. 143, pl. xii. figs. 1, 1a, 1b.
1901. *Stigmaria ficoides*, Potonié, *Silur- u. d. Culm-Flora d. Harzes. u. d. Maddeburgischen*, p. 100, fig. 59.
1902. *Stigmaria ficoides*, Kidston, *Proc. Yorks. Geol. Polytech. Soc.*, vol. xiv. part iii. p. 356, fig. 10, pl. lvi. fig. 3.
1838. *Stigmaria*, King, *Edin. New Phil. Journ.*, vol. xxxviii. pp. 119, 135, pl. v. figs. 1-2.
1835. *Caulopteris gracilis*, L. and H., *Foss. Flora*, vol. ii. p. 163, pl. cxli.
1862. *Stigmaria anabathra*, Goldenberg (non Corda?), *Flora Saræp. foss.*, Heft iii. p. 19, pl. xi. fig. 7, pl. xiii. figs. 3-4, 9-11, 13-17 (includes vars.).
1872. *Stigmaria*, Williamson, *Phil. Trans.*, pp. 220, 234, 235, pl. xxix. figs. 44-46, pl. xxx. figs. 43, 47-49, 51, pl. xxxi. figs. 50, 52, 53.
1876. *Lepidophyllum caricinum*, Heer, *Foss. Flora Spitzbergens*, p. 14, pl. iii. fig. 26 (Rootlets).
1888. *Stigmaria*, Renault, *Les plants fossiles*, p. 293, fig. 38.
1890. *Stigmaria*, Potonié, *Jahrb. d. Königl. preuss. geol. Landesanstalt für 1889*, p. 246, pls. xix.-xxii.
1894. "Stigmarian Stool," Kidston, *Trans. Manchester Geol. Soc.*, part xxi. vol. xxii. p. 639, figs.
1899. *Stigmaria*, Potonié, *Lehrb. d. Pflanzenpalæont.*, p. 210, figs. 202-204.
1899. *Stigmaria verrucosa*, White, *Foss. Flora of Lower Coal Meas. of Missouri*, p. 244.

Localities.—Glencartholm, Eskdale; Peel Burn, near Myredykes, Liddlehead, and Saughtree, Liddesdale.

Stigmaria ficoides, var. *undulata*, Göppert.

1841. *Stigmaria ficoides*, var. *undulata*, Göpp., *Gatt. d. foss. Pflanzen.*, Lief. 1-2, pp. 13, 30, pl. ix. figs. 5-8 (? fig. 9).
1852. *Stigmaria ficoides*, var. *undulata*, Göpp., *Foss. Flora d. Übergangs*, p. 245, pl. xxxii. fig. 2.

1884. *Stigmaria ficoides*, var. *undulata*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part *Palæont.*, ii, p. 96, pl. xix. fig. 3.

1873. *Stigmaria ficoides*, Feistmantel, *Zeitsch. d. deut. geol. Gesell.*, vol. xxxv. pp. 535, 540, pl. xvii. fig. 37.

1865. *Stigmaria*, with scars in rhomboidal areas, Dawson, *Quart. Journ. Geol. Soc.*, vol. xxii. p. 169, pl. xii. fig. 83.

Locality.—Left bank of Mein Water, two miles N.E. of Ecclefechan. Collected by Mr J. BENNIE.

Cordaiteæ.

Cordaites, Unger.

Cordaites, sp.

Locality.—Foot of Tweeden Burn, Liddesdale.

Carpolithes, Schlotheim.

Carpolithes, sp.

1883. *Cardiocarpus*, sp., Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 545, pl. xxxii. fig. 6.

Locality.—Glencartholm, Eskdale.

Incertæ sedis.

Ptilophyton, Dawson.

1878. *Ptilophyton*, Dawson, *Canadian Naturalist*, vol. viii. No. 7, February ("Notes on some Scottish Devonian Plants," p. 7).

I do not think it can be claimed that the true systematic position of the genus *Ptilophyton*, Dawson, has yet been clearly determined. The late Sir WILLIAM DAWSON included five species in his genus *Ptilophyton*.* These were :—

1. *Ptilophyton pennæformis*, Göppert, sp.†
2. *Ptilophyton Vanuxemi*, Dawson, sp.‡
3. *Ptilophyton plumula*, Dawson, sp.§
4. *Ptilophyton Thomsoni*, Dawson.||
5. *Ptilophyton lineare*, Lx., sp.¶

* *Canadian Naturalist*, vol. viii. No. 7, Feby. 1878, and specially see *Geol. Survey of Canada,—Fossil Plants of the Erian (Devon.) and Upper Silurian Forms of Canada*, part ii. p. 119, 1882.

† *Lycopodites pennæformis*, Göpp., *Foss. Flora d. Silur. Devon. u. unter. Kohlenf.*, p. 84, pl. xlii. fig. 2, 1860.

‡ *Lycopodites Vanuxemi*, Dawson, *Quart. Journ. Geol. Soc.*, vol. xviii. p. 314, pl. xvii. fig. 57, 1862.

§ *Lycopodites plumula*, Dawson, "Rept. Fossil Plants,—Low Carboniferous and Millstone Grit Forms, Canada," p. 24, pl. i. figs. 7–9, 1873 (*Geol. Survey of Canada*).

|| "Notes on some Scottish Devonian Plants," *Canadian Nat.*, vol. viii., Feby. 1878. See also figure of this specimen given by CARRUTHERS, *Journal of Botany*, Nov. 1873, pl. cxxxvii. fig. 2.

¶ *Trochophyllum lineare*, Lesqx., *Coal Flora*, vol. i. p. 64, pl. iii. figs. 24, 25, 25b, 1879. *Ptilophyton lineare*, Lesqx., *ibid.*, vol. iii. p. 791, 1884. Dawson, *Geol. Survey of Canada*, "Fossil Plants of Erian (Devon.) and Upper Silur. Forms of Canada," part iii. p. 119, 1882.

Of these, numbers 2 and 4 are Devonian, the others are carboniferous.

Ptilophyton Thomsoni must, however, be excluded from the genus, as more perfect specimens show it to belong to a different class of plants from that with which the remaining species of *Ptilophyton* are supposed to have affinities. The late Sir WILLIAM DAWSON sums up the conclusions to which he had arrived as to the systematic position of *Ptilophyton* in the following paragraph:—"The species of *Ptylophyton* will thus constitute a peculiar group of aquatic plants belonging to the Devonian and Lower Carboniferous Periods, and perhaps allied to Lycopods and Pillworts in the organisation and fruit, but specially distinguished by their linear leaves serving as floats, and arranged pinnately on slender stems." *

The British Museum possesses a fine specimen † from Stonegun, near Thurso, which shows *Ptilophyton Thomsoni* terminating a stem 16 inches long, and rather less than quarter of an inch thick, and which shows the remains of lateral branches. Similar stems, not showing the terminal portion—the *Ptilophyton Thomsoni*—cannot be distinguished from stems of *Psilophyton*, and under the name of *Psilophyton Dechenianus*, Göpp., sp., I have recorded these, ‡ believing that plant to be synonymous with *Psilophyton robustius*, Dawson, but I now regard these two plants as specifically distinct.

From the further study of additional material within the last few years, I have now little doubt that the stem described as *Caulopteris* (?) *Peachii* by SALTER § is only the larger trunk which bore the branches I identified as *Psilophyton Dechenianus*, and whose terminal portion, as already stated, is the *Ptilophyton Thomsoni* of DAWSON. It is impossible, therefore, to include *Ptilophyton Thomsoni* in the genus *Ptilophyton* as defined by DAWSON.

The *Ptilophyton lineare*, Lesq., sp., I would also feel inclined to exclude from DAWSON's genus, but not having seen any specimens of this plant it is unsafe to express any definite opinion on this point.

DAWSON and LESQUEREUX had apparently no doubt as to the vegetable nature of *Ptilophyton*, but their figures do not show all the characters they mention; and judging from the only examples of *Ptilophyton* which have come under my observation, and which are certainly the *Ptilophyton plumula*, Dawson, I must confess to still having some doubt as to the vegetable nature of the organisms included in this genus.

HALL || at one time described the fossils subsequently placed in *Ptilophyton* by DAWSON under the name of *Ptilophyton Vanuxemi* as perhaps crinoid tentacles, or more probably analogous to the *Sertularia*, and regarded them as animal structures.

* "Fossil Plants, Erian (Devon.) and Upper Silur. Forms. of Canada," part ii. p. 122, 1882.

† Geol. Department, Registration No. V1419.

‡ *Catal. of Palæozoic Plants in the British Museum*, p. 232.

§ *Caulopteris* (?) *Peachii*, Salter, *Quart. Journ. Geol. Soc.*, vol. xv. p. 408, fig. 14.

|| Vanuxem, *Nat. Hist. New York*, "Geol. of New York," part iii., Survey of the Third Geological District, p. 175, fig. 46, 1842; also Hall, *Nat. Hist. of New York*, "Geol. of New York," part iv., Geol. of Fourth Geol. District, p. 273, fig. 125, Albany, 1843.

Ptilophyton plumula, Dawson, sp.

1873. *Lycopodites plumula*, Dawson, "Rept. on Fossil Plants of Lower Carb. and Millstone Grit Forms of Canada" (*Geol. Survey of Canada*), p. 24, pl. i. figs. 7-9.
 1878. *Ptilophyton plumula*, Dawson, *Canadian Nat.*, vol. viii. No. 7, Feby. ("Notes on Scottish Devonian Plants," p. 7).
 1882. *Ptilophyton plumula*, Dawson, *Fossil Plants of Devon. and Upper Silur. Forms of Canada*, p. 121 (*Geol. Survey of Canada*).

Locality.—Glencartholm, Eskdale.

Schutzia, Geinitz.

Schutzia, sp.

1883. *Schutzia*, sp., Kidston, *Trans. Roy. Soc. Edin.*, vol. xxx. p. 545, pl. xxxi. figs. 10-12.

Localities.—Tweedon Burn and Kershope Burn, Liddesdale.

Bythotrephis, Hall.

Bythotrephis gracilis, Hall.

(Plate I. fig. 3.)

1843. *Fucoides gracilis*, Hall, *Nat. Hist. of New York*, "Geol. of New York," part iv., Survey of Fourth Geol. District, p. 69, fig. 14.
 1848. *Buthotrephis gracilis*, Hall, *Nat. Hist. of New York*, "Palæont. of New York," vol. i. p. 62, pl. xxi. fig. 1.
 1852. *Buthotrephis gracilis*, Hall, *ibid.*, vol. ii. p. 18, pl. v. figs. 1a, 1b, 1c, 1d.
 1884. *Buthotrephis gracilis*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Annual Report*, part ii. p. 30, pl. i. figs. 6, 7 (? fig. 1).
 1869. *Bythotrephis gracilis*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 198.
 1852. *Bythotrephis gracilis*, var. *intermedia*, Hall, *Nat. Hist. of New York*, "Palæont. of New York," vol. ii. p. 19, pl. v. figs. 2a, 2b.
 1852. *Bythotrephis gracilis*, var. *crassa*, Hall, *ibid.*, vol. ii. p. 19, pl. v. figs. 3a, 3b, 3c, 3d.
 1879. *Palæophycus gracilis*, Lesqx., *Coal Flora*, vol. i. p. 11 (? pl. B, figs. 9-10a).
 1883. *Chondrites Targioni*, Kidston (*non* Brongt.), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 548.

Remarks.—The specimen figured on pl. i. fig. 3 was originally identified as *Chondrites Targioni*, Brongt.,* and there is really no character by which some of the forms of *Bythotrephis gracilis*, Hall, can be separated from *Chondrites Targioni*, Brongt., but experience has shown that the change which has taken place in the flora of the palæozoic rocks make it most improbable that any palæozoic species passes into the later strata which yields *Chondrites Targioni*. Hence, as already mentioned,† the palæozoic species of the type of *Chondrites Targioni* are now placed in a separate genus.

The form of the plant collected at Borron Point, Arbigland, agrees with HALL'S

* *Hist. d. végét. foss.*, p. 56, pl. iv. figs. 2-6.

† *Ante*, p. 743.

Bythotrephes gracilis, var. *intermedia*, pl. v. fig. 2 (*l.c.*), though this differs little from some of the forms included under the var. *crassa*. The whole series of type and varieties described by HALL pass insensibly into each other.

Locality and Horizon.—From the Cementstone group of the Calciferous Sandstone series in limestone beds on the shore between the gardener's cottage and Borron Point, Arbigland, Kirkeudbrightshire.

FOSSIL PLANTS OF THE CARBONIFEROUS LIMESTONE SERIES.

The only section of this series from which we were successful in collecting fossil plants is that exposed along the right bank of the river Esk, extending from the Gilnockie Limestones (which include the equivalent of the Hurlet Limestone) to immediately above Byre Burn Bridge, where the Carboniferous Limestone Series is faulted against the Middle Coal Measures of Byre Burn.

The plants collected from this series are from the following localities :—

- A. Sandstone bed, river Esk, right bank, about 150 yards below Gilnockie Bridge.
- B. Black Carbonaceous Shale, river Esk, right bank, about 200 yards above foot of Byre Burn.
- C. Sandstone bed, river Esk, right bank, about 125 yards above foot of Byre Burn.

Algæ.

Spirophyton, Hall.

Spirophyton cauda-galli, Vanuxem, sp.

Spirophyton cauda-galli, Vanuxem, sp. See *ante*, p. 744.

Locality C.—Entirely filling a bed of sandstone.

Lycopodiaceæ.

Lepidodendron, Sternberg.

Lepidodendron Glincanum, Eichwald, sp.

(Plate II. figs. 20, 21 ; Plate III. figs. 27, 28 ; Plate IV. figs 37–40 ;
Plate V. figs. 41–43.)

1860. *Sagenaria Glincana*, Eichwald, *Lethæa Rossica*, vol. i., Ancienne Période, p. 127, pl. v. figs. 21–22, pl. va. figs. 1–10.

1870. *Lepidodendron Glincanum*, Schimper, *Traité d. paléont végét.*, vol. ii. p. 34.

1883. *Lepidodendron Glincanum*, Schmalhausen, *Die Pflanzenreste der Steinkohlenformation am Ostlichen Abhange des Ural Gebirges* (*Mém. l'Acad. Impér. d. Sc. d. St Pétersbourg*, vii^e sér., vol. xxxi. No. 13), p. 11, pl. ii. figs. 5–16, pl. iii. figs. 1–19, pl. iv. figs. 1–5.

Description.—"Leaves narrow, linear, sharp-pointed, spreading, seldom upright, bent in a sigmoid manner. Sporangial portion of bracts at right angles to the axis, free

portion directed upwards, long and acicular. Leaf cushions on the young stems arranged in distinctly spiral columns; on the old stems the leaf cushions form distinct vertical rows. Leaf cushions with longitudinal keel, generally with a rhomboidal half-moon-shaped scar placed above the middle, and below the scar on each side occurs a somewhat bent little linear scar. Leaf cushions on the young stems generally touching each other, rhomboidal, almost quadrate to elongate rhomboidal, or even obovate, and with pointed or elongated ends. Leaf cushions in old age six-angled, fusiform to almost lyre-shaped, generally arranged in vertical rows, and with the extremities united to each other, seldom separate; the leaf cushions on neighbouring columns alternate with each other, and are separated by a more or less broad band of longitudinally wrinkled or reticulated bark."

Remarks.—The above description is that drawn up by SCHMALHAUSEN after a careful examination of numerous specimens, and may be regarded as a reply to the opinion expressed by STUR that *Lepidodendron Glincanum* belonged partly to *Lepidodendron Veltheimii*, Sternb., and partly to *Lepidodendron Volkmannianum*, Sternb.*

In addition to a large amount of material from different localities, SCHMALHAUSEN re-examined the specimens seen by STUR, and several of these are figured in his *Pflanzenreste der Steinkohlenformation am Östlichen Abhange des Ural Gebirges*."

Certain forms of *Lep. Glincanum* have some resemblance to *Lepidodendron Veltheimii*, and others with vertical rows of leaf cushions remind one of *Lepidodendron Volkmannianum*, especially the figure of a somewhat imperfectly preserved specimen given by EICHWALD on his pl. va. fig. 7; but notwithstanding this resemblance of certain specimens to these two species, it does not appear possible to refer *Lepidodendron Glincanum* to either *Lepidodendron Veltheimii* or *Lepidodendron Volkmannianum*, as proposed by STUR. Even if *Lepidodendron Glincanum*, as refigured and described by SCHMALHAUSEN, contains more than one species, it is not to either of these species that it can be referred, and it may well be that *Lepidodendron Glincanum*, as believed by SCHMALHAUSEN, may be a single but very variable species.

The most peculiar character connected with *Lepidodendron Glincanum* appears to be the two series into which the specimens can be divided, namely, those with spirally placed leaf cushions and those on which the leaf cushions are placed vertically, the latter condition being usually restricted to aged stems; still, SCHMALHAUSEN states that all these varieties are connected by intermediate forms.

SCHMALHAUSEN recognised the following varieties:—

- A. *tessellatum*, pl. iii. figs. 1–4, 6.
- B. *obovatum*, pl. iii. figs. 7, 7a, 8.
- C. *rimosum*, pl. iii. figs. 9–15.
- D. *sigillariiforme*, pl. iii. figs. 16–19, pl. iv. figs. 1–4.†

* *Ein Beitrag zur Kenntniss d. Culm und Carbon Flora in Russland*,—*Verhandl. d. k. k. Geol. Reichsanstalt*, vol. xxviii., Jahrgang 1878, No. 11, p. 219.

† These references apply to SCHMALHAUSEN's paper already referred to.

All the specimens met with at Canonbie belong to those with spirally placed leaf cushions, with the exception of that given on Plate V. fig. 41, where the cushions form almost upright columns.

Description of Specimens:—

At Pl. II. fig. 21 are shown fragments of small branches. A portion of one of these is given enlarged two times at Pl. IV. fig. 37, and an outline of one of the cushions and leaf scar at fig. 38.

The leaf cushions are contiguous, rhomboidal, keeled, with lateral angles rounded; the leaf scar, which is placed above the centre of the cushion, is transversely rhomboidal, lateral angles pointed, upper and lower angles rounded but prominent. This corresponds to SCHMALHAUSEN's var. *tessellata*, pl. iii. figs. 1-3, but the leaf scar on my specimens is a little larger.

Pl. II. fig. 20, of which a portion is enlarged two times on Pl. IV. fig. 39, and outline of the cushion and scar given at fig. 40.

The leaf cushions here are more fusiform, slightly separated, and provided with prolonged ends, which generally unite with the prolonged point of the cushions above and below in the same series, but sometimes the prolongations of the cushions do not unite, but the extremities pass each other laterally. This form corresponds to SCHMALHAUSEN's var. *obovatum*, pl. iii. fig. 7. The leaf scar, which is placed above the centre, is also slightly larger than in the figures given by SCHMALHAUSEN, but I believe this may be accounted for by the better preservation of my specimens. The cortex between the cushions is feebly striated longitudinally.

Plate V. fig. 41, a portion of which is enlarged two times on Pl. V. fig. 42, and outline sketch of cushion and scar shown at fig. 43.

The cushions here are fusiform, with long slightly bent produced extremities, with a distinct tendency to form vertical columns. The produced points sometimes unite with neighbouring leaf cushions, sometimes pass each other at their extremities. The leaf scars are separated by a band of irregularly longitudinally striated cortex. This is the var. *rimosum*, and corresponds to the figure given by SCHMALHAUSEN on his pl. iii. fig. 12. This variety differs from *Lepidodendron rimosum*, Sternb., in the leaf scar being proportionally larger; it here occupies almost the complete width of the cushion, whereas in *Lepidodendron rimosum*, Sternb., it occupies less than half the width of the cushion. *Lepidodendron Glincanum*, var. *rimosum*, also differs in the coarser striation of the interfoliar cortex, which is apparently not ornamented with fine oblique striæ as in *Lepidodendron rimosum*, Sternb.

Pl. III. fig. 28. This specimen probably shows an older condition of the var. *tessellatum*, with quadrate leaf cushions. The leaf scars are effaced, and the specimen seems to have suffered from pressure.

Pl. III. fig. 27. This illustrates a still older condition of the plant. Only the leaf cushions are shown, the leaf scar being quite obliterated, probably the result of age. The specimen shows very clearly the truncation of the leaf cushions, especially at their

lower extremities. This is well seen on the cushions marked *a* and *b*, which are bluntly rounded, and that this is not the result of fracture or break is proved by the margin having a distinct and slightly upturned border. This example is approaching to the aged stems described by SCHMALHAUSEN with 'six-angled' leaf cushions.

The specimens just described record the first occurrence of *Lepidodendron Glincanum*, Eichwald, sp., in Britain, and which, as far as I am aware, has not been previously met with outside of Russia.

The bed from which the specimens were collected consisted largely of decorticated and flattened stems of *Lepidodendra* and *Sigillaria*, with a few specimens of *Stigmaria*. The only plants contained in the bed which could be specifically identified were *Lepidodendron Glincanum*, Eich., sp., *Sigillaria Canobiana*, n.sp., and *Stigmaria ficoides*, Sternb., sp. The fragments of large decorticated trunks in all likelihood belonged to the two species of arborescent Lycopods with which they were associated.

Locality B.

Sigillaria, Brongniart.

Sigillaria Canobiana, Kidston, n.sp.*

(Plate III. fig. 26 ; Plate IV. figs. 29-35 ; Plate V. figs. 46-47.)

Description.—Stem ribbed, ribs expanded in neighbourhood of leaf scar ; leaf scars more or less distant, occupying whole width of rib, rhomboidal, upper and lower angles rounded, usually with a notch on the upper side, lateral angles prominent, cicatricules about the middle of scar, central punctiform, the two lateral lunate. Ribs ornamented with transverse wrinkles, especially distinct above the leaf scars, but becoming gradually less distinct upwards.

Description of Specimens.—This species was fairly plentiful, and the plates illustrate the various states and ages of the plant.

Plate III. fig. 26 ; Plate IV. figs. 29-30. The youngest condition met with is shown natural size at Plate III. fig. 26 ; a portion of this specimen enlarged two times is given on Plate IV. fig. 29, and an outline of a leaf scar at fig. 30. This example has not suffered from pressure, for the leaf scars are placed on gradually increasing elevations of the rib, from the summit of which the leaf scars slope back. The leaf scars are rhomboidal, with rounded upper and lower angles and prominent lateral angles. This is the only specimen I possess of this species on which the leaf scars have no distinct notch on their upper margin. The leaf scars are here separated by little more than their own height.

Plate IV. fig. 33, natural size, portion enlarged two times at fig. 34, and outline scar at fig. 35.

Although from the size of the leaf scars this is probably portion of an older specimen than the last, the leaf scars are rather closer. The ribs do not show the elevation of

* Called after the parish of Canobie, more usually designated Canonbie.

the leaf scar as in Pl. III. fig. 26, but the absence of this elevation on this and the succeeding examples is evidently the result of pressure. The leaf scars on this specimen are scarcely so wide as the rib, and from their lateral angles two little lines run downwards, and in some cases seem to bend inwards and meet, cutting off an oval area. At first sight one might think this specimen specifically distinct from the other examples of *Sigillaria Canobiana* described here, but the upper part of the fossil marked A shows the ordinary form of the species, though towards the middle, and especially to the left, the leaf scars become closer and appear as if separated into compartments, but at the base at B they again begin to assume the normal condition. Such approximation of the leaf scars on the stems of *Sigillariæ* is no uncommon occurrence.

Plate IV. fig. 31 is portion of another specimen enlarged two times, and fig. 32 shows an outline sketch of a leaf scar and portion of a rib. The distinctive characters of the species are well shown on this example. The general form of the leaf scar is rhomboidal, the upper margin is distinctly notched, the lower is rounded, while the lateral angles are prominent. The leaf scars occupy the whole width of the rib, which at this point widens out. Immediately below the leaf scar the rib narrows gradually till it reaches the scar beneath, where it slightly expands again, though it still remains considerably narrower than the leaf scar against which it terminates. The margin of the interfoliar region of the rib thus forms a sigmoid line, the sinus of whose curve is occupied by the inflated portion of the neighbouring rib. The transverse wrinkling on the surface of the rib, which extends almost over the whole width, is strongest immediately above the leaf scar, and becomes more feeble as it is traced upwards, till below the next higher leaf scar it is absent or only very slightly shown. The leaf scars are here more distant than on the specimens already described, being distant from each other about the space of two leaf scars.

Plate V. fig. 45, natural size, portion enlarged two times given at fig. 46, and outline sketch of scar at fig. 47.

The leaf scars on this specimen are more truly rhomboidal than on some of the examples already described, and are slightly more distantly placed. As in all cases except that shown on Plate IV. fig. 33, they occupy the whole width of the rib, which at their point of insertion is widened.

Fig. 45 illustrates well the inflation of the rib, which, a short distance below the scar, becomes contracted. The margin of the upper part of the rib between the leaf scars is convex, but it afterwards runs almost straight till it abuts on the scar below it. The sigmoid curve is not so prominent as in Plate IV. fig. 31. The transverse wrinkling on the surface of the interfoliar cortex is similar to that of the specimens already described.

Remarks.—There is no species of *Sigillaria*, as far as I am aware, with which *Sigillaria Canobiana* could be mistaken. Its nearest ally is probably *Sigillaria poly-ploca*, Boulay.* The ribs in this species are also inflated, but their widest part is a

* *Sigillaria poly-ploca*, Boulay, *Terr. houil. du Nord de la France*, p. 47, pl. ii. fig. 8, 1876. See also Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 450, pl. lxxxii. figs. 7–8.

little distance below the more elongated leaf scar, which does not occupy the whole width of the rib and which is surmounted by a distinct lunate scar. These characters at once distinguish the two species. *Sigillaria polypleca* appears to be restricted in its distribution to the Middle Coal Measures.

Sigillaria Canobiana is also easily known from *Sigillaria Youngiana*, Kidston,* which has much more contracted and expanded ribs, their width about midway between the leaf scars being only half the width of the rib shortly below the leaf scar, by the form and position of the leaf scar which is placed about the centre of the inflation, and by the delicate very short lines, mostly upright, with which the surface of the inter-foliar cortex is ornamented.

Sigillaria Youngiana, which comes from the Possil Ironstone group of the Carboniferous Limestone series, and *Sigillaria Canobiana* are the only two ribbed *Sigillariæ* yet discovered in the Lower Carboniferous Rocks of Britain, and the first mentioned is only known from a single specimen.

Localities A and B.

Stigmaria, Brongniart.

Stigmaria ficoides, Sternb., sp.

Stigmaria ficoides, Sternb., sp. (See *ante*, p. 757.)

Locality B.—Common.

Stigmaria ficoides, Sternb., sp. var.

Locality B.

Stigmaria (? Stigmariopsis) rimosiformis, Kidston, n.sp.

(Plate II. fig. 15.)

Description.—Rootlet scars in structure and position as in *Stigmaria ficoides*; cortex ornamented with irregularly flexuous lines, which converge towards the rootlet scars, especially on the two sides facing the axis of the rhizome.

Remarks.—This *Stigmaria* has some similarity to the *Stigmaria ficoides*, var. *rimosa*, Goldenberg,† but in *Stigmaria rimosiformis* the ridges are more numerous, finer, and converge towards the scars, where they are thinner and closer than on the inter-rootlet portion of the cortex, whereas in *Stigmaria ficoides*, var. *rimosa*, Goldenberg, the ridges are coarser and more distant, and have the tendency to bend round the scars, not converging towards them.

It seems to me possible that both *Stigmaria ficoides*, var. *rimosa*, Gold., and

* *Sigillaria Youngiana*, Kidston, *Proc. Roy. Phys. Soc. Edin.*, vol. xii. p. 261, pl. vi. figs. 2, 2a.

† *Stigmaria Anabathra*, var. *rimosa*, Goldenberg, *Flora Saxæp. foss.*, Heft iii. p. 19, pl. xiii. fig. 16.

‡ See KIDSTON, *Carboniferous Lycopods and Sphenophylls*,—*Trans. Nat. Hist. Soc. Glasgow*, vol. vi. (new series) p. 108, 1901.

Stigmaria rimosiformis may belong to the genus *Stigmariopsis*, Grand' Eury. The internal structure of these two rhizomes is unknown, but the ridges on the surface are probably the external indications of sclerenchymatous bands in the outer cortex, which is one of the characters of *Stigmariopsis*, but is a character not observed in any specimens of undoubted *Stigmaria* which have shown their internal organisation.

Locality A.

FOSSIL PLANTS OF THE LOWER COAL MEASURES.

All the fossil plants from this division were collected from the coals at present being worked at Rowanburn.

In addition to the specimens collected by ourselves, Mr KENNETH BOWIE showed us examples of *Calamites undulatus*, Sternb., and *Calamites Cistii*, Brongt.

Filicaceæ.

Sphenopteris, Brongniart.

Sphenopteris obtusiloba, Brongt.

- 1829. *Sphenopteris obtusiloba*, Brongt., *Hist. d. végét. foss.*, p. 204, pl. liii. fig. 2*.
- 1833. *Sphenopteris obtusiloba*, Sternb., *Essai flore monde prim.*, vol. ii. fasc. v.-vi. p. 63.
- 1848. *Sphenopteris obtusiloba*, Sauveur (*pars*), *Végét. foss. d. terr. houil. Belgique*, pl. xv. fig. 2 (*non* pl. xvi. fig. 3).
- 1854. *Sphenopteris obtusiloba*, Ettingshausen, *Steinkf. v. Radnitz*, p. 37, pl. xxi. fig. 2.
- 1869. *Sphenopteris obtusiloba*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 55, pl. xvi. fig. 10 (? fig. 11) (? pl. xxix. fig. 9).
- 1869. *Sphenopteris obtusiloba*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 399, pl. xxx. fig. 1.
- 1879. *Sphenopteris obtusiloba*, Schimper, in Zittel, *Handb. d. palæont.*, vol. ii. p. 108, fig. 77.
- 1879. *Sphenopteris obtusiloba*, Roemer, *Lethæa geog.*, vol. i. p. 169, pl. 51, figs. 1a, 1b.
- 1880. *Sphenopteris obtusiloba*, Zeiller, *Végét. foss. du terr. houil.*, p. 39, pl. clxii. figs. 1-2.
- 1882. *Sphenopteris obtusiloba*, Weiss, *Aus d. Steink.*, p. 13, pl. xi. fig. 67 (zweiter abdr.).
- 1883. *Sphenopteris obtusiloba*, Renault, *Cours d. botan. foss.*, vol. iii. p. 190, pl. xxxiii. figs. 5-6.
- 1886. *Sphenopteris obtusiloba*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 65, pl. iii. figs. 1-4, pl. iv. fig. 1, pl. v. figs. 1-2.
- 1893. *Sphenopteris obtusiloba*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxvii. p. 321, pl. i. fig. 1.
- 1899. *Sphenopteris obtusiloba*, Zeiller, *Étude sur la flore fossile du bassin houiller d'Héraclée (Asie Mineure)*,—*Mém. Soc. géol. d. France*, No. 21, p. 5.
- 1899. *Sphenopteris obtusiloba*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 137, fig. 131.
- 1899. *Sphenopteris obtusiloba*, Hofmann and Ryba, *Leitpflanz.*, p. 38, pl. iii. fig. 23, pl. iv. figs. 1-2.
- 1901. *Sphenopteris obtusiloba*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. pp. 191, 205, pl. xxv. figs. 1, 1a.
- 1877. *Diplothema obtusilobum*, Stur, *Culm Flora*, Heft ii. p. 230.
- 1885. *Diplothema obtusilobum*, Stur, *Die Farne d. Carb. Flora*, vol. i. p. 354, pl. xxv. fig. 8, pl. xxv. b, fig. 1.
- 1888. *Diplothema obtusilobum*, Toula, *Die Steinkohlen*, p. 187, pl. i. figs. 7-8.
- 1836. *Cheilanthites obtusilobus*, Göpp., *Syst. fil. foss.*, p. 246.

1865. *Gymnogramme obtusiloba*, Ett., *Foss. Flora d. Mähr.-schles. Dachschiefers*, p. 22, excl. fig. 6.
 1884. *Pseudoplectopteris obtusiloba*, Lesqx., *Coal Flora*, vol. iii. p. 753.
 1899. *Pseudoplectopteris obtusiloba*, White, *Foss. Flora of the Lower Coal Measures of Missouri*, p. 24, pl. vii. figs. 1-3, pl. viii.
 1833. *Sphenopteris irregularis*, Sternb., *Essai Flore monde prim.*, vol. ii. fasc. 5-6, p. 63, pl. xvii. fig. 4.
 1862. *Sphenopteris irregularis*, Roemer, *Palæont.*, vol. ix. p. 24. pl. v. fig. 5.
 1866. *Sphenopteris irregularis*, Andræ, *Vorwelt. Pflanzen.*, p. 24, pl. viii., pl. ix. fig. 1.
 1869. *Sphenopteris irregularis*, Roehl, *Flora d. Steink.-Form. Westph.*, p. 56, pl. xvi. fig. 2, pl. xxxi. figs. 5-6.
 1869. *Sphen. (Gymnogrammules) irregularis*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 373.
 1836. *Cheilanthes irregularis*, Göpp., *Syst. fil. foss.*, p. 247.
 1877. *Diplothmema irregulare*, Stur, *Culm Flora*, Heft ii. p. 230.
 1885. *Diplothmema irregulare*, Stur, *Die farne d. Carb. Flora*, vol. i. p. 296.
 1880. *Pseudoplectopteris irregularis*, Lesqx., *Coal Flora*, vol. i. p. 211 (? pl. lii. figs. 1-3, 8).
 1830. *Sphenopteris trifoliolata*, Brongt. (*non* Artis), *Hist. d. végét. foss.*, p. 202, pl. liii. fig. 3.
 1848. *Sphenopteris trifoliolata*, Sauveur (*non* Artis), *Végét. foss. d. terr. houil. Belgique*, pl. xix. fig. 2, pl. xxi.
 1866. *Sphenopteris trifoliolata*, Andræ (*non* Artis), *Vorwelt Pflanzen.*, p. 28, pl. ix. figs 2-4.
 1869. *Sphenopteris trifoliolata*, Roehl (*non* Artis), *Foss. Flora d. Steink.-Form. Westph.*, p. 65, pl. xvi. fig. 3.
 1883. *Sphenopteris trifoliolata*, Renault (*non* Artis), *Cours d. botan. foss.*, vol. iii. p. 192, pl. xxxiii. figs. 7-8.
 1886. *Sphenopteris trifoliolata*, Zeiller (*non* Artis), *Flore foss. bassin houil. d. Valen.*, p. 75, pl. i. figs. 1-4.
 1899. *Sphenopteris trifoliolata*, Potonié (*non* Artis), *forma lara*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 137, fig. 130.
 1848. *Sphenopteris granulifrons*, Sauveur, *Végét. foss. d. terr. houil. Belgique*, pl. xiv.
 1883. *Sphenopteris Weissiana major*, Achepohl, *Niederrhein.-Westfäl. Steink. Gebirge*, p. 121, pl. xxxvii. figs. 14-18.
 1883. *Sphenopteris Schillingsii?* Achepohl, *ibid.*, p. 89, *Ergänzungs Blatt*, iv. figs. 21-22.
 1883. *Sphenopteris Andräi*, Achepohl, *ibid.*, p. 94, pl. xxxii. fig. 2, *Ergänzungs Blatt*, iv. fig. 37.
 1883. *Sphenopteris Andräi major*, Achepohl, *ibid.*, p. 122, pl. xxxviii. fig. 4, *Ergänzungs Blatt*, iv. fig. 64.
 1883. *Sphenopteris Weissiana*, Achepohl, *ibid.*, p. 114, pl. xxxiv. figs. 16-18, *Ergänzungs Blatt*, iv. fig. 55.
 1886. *Sphenopteris polyphylla*, Zeiller (*non* L. and H.), *Flore foss. bassin houil. d. Valen.*, p. 73, pl. i. fig. 4.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with "Five-foot Coal."

Remarks.—Considerable confusion seems to exist amongst continental botanists as to the distinctive characters of *Sphenopteris trifoliolata*, Artis, sp., for, as far as known to me, none of the specimens which have been identified as that species by continental writers are referable to Artis' plant. *Sphenopteris trifoliolata*, Artis, sp., does not appear to have been met with out of Britain.

The pinnules of *Sphenopteris trifoliolata* are smaller and more distant than those of *Sphenopteris obtusiloba* and the plant has a much laxer growth. A trifoliata arrangement of the pinnules is frequent on some specimens of *Sphenopteris obtusiloba*,—a form probably only depending on its position on the frond,—and this is the plant which has invariably been mistaken for *Sphenopteris trifoliolata*, Artis, sp.

Sphenopteris trifoliolata, though not common, is not unfrequent in the Middle Coal

Measures of England, and I have examined a number of specimens collected by Mr HEMINGWAY from the same horizon (Barnsley Thick Coal) as that from which the type was derived.

The plant figured by ZEILLER as *Sphenopteris polyphylla*, L. and H., appears to me to be also referable to *Sphenopteris obtusiloba*; in any case it is not the *Sphenopteris polyphylla*, L. and H.,* which is rare in Britain, but the type specimen has fortunately been preserved.† The pinnules are much more obovate than in *Sphenopteris obtusiloba*, and the terminal pinnule is proportionally larger. *Sphenopteris polyphylla* has somewhat the appearance of an *Adiantites*. As the original figure of the species represented the plant more dense and heavier in growth than it really is, I refigured the type in 1892 in the *Proc. Roy. Phys. Soc. Edin.*, vol. xi. pl. ix. fig. 2.

(?) *Sphenopteris Schützei*, Stur, sp.

1885. *Hapalopteris Schützei*, Stur, *Farne d. Carbon-Flora d. Schatz. Schichten*, p. 56, pl. xli. figs. 1, 1a, 2, 3, 4.
 1886. (?) *Sphenopteris (Hapalopteris) Schützei*, Kidston, *Trans. Geol. Soc. Glasgow*, vol. viii. p. 57, pl. iii. figs. 5, 5a, 5b.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of Main Coal.

Note.—Only a small fragmentary specimen was found.

Eremopteris, Schimper.

Eremopteris artemisiæfolia, Sternb., sp.

1826. *Sphenopteris artemisiæfolia*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xv., pl. liv. fig. 1.
 1828. *Sphenopteris artemisiæfolia*, Brongt., *Prodrome*, p. 50.
 1829. *Sphenopteris artemisiæfolia*, Brongt., *Hist. d. végét. foss.*, p. 176, pl. xlvi., pl. xlvii. figs. 1–2.
 1848. *Sphenopteris artemisiæfolia*, Sauveur (pars), *Végét. foss. d. terr. houil. Belgique*, pl. xx. fig. 3 (non figs. 1–2).
 1836. *Gleichenites artemisiæfolius*, Göpp., *Syst. fil. foss.*, p. 184.
 1869. *Eremopteris artemisiæfolia*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 416, pl. xxx. fig. 5.
 1879. *Eremopteris artemisiæfolia*, Lesqx., *Coal Flora*, p. 293, pl. liii. figs. 5–6.
 1883. *Eremopteris artemisiæfolia*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part ii., *Palæont.*, p. 69, pl. xv. fig. 5.
 1899. *Eremopteris artemisiæfolia*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 143, fig. 139.
 1877. *Sphenopteris (Eremopteris) artemisiæfolia* (?), var., Lebour, *Illustr. of Fossil Plants*, pl. xxxiii.
 1826. (?) *Sphenopteris laxa*, Sternb., *Essai flore monde prim.*, fasc. 2, p. 40; fasc. 4, p. xv. pl. xxxi. fig. 3.
 1826. *Sphenopteris stricta*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xv., pl. lvi. fig. 3; vol. ii. p. 57.

* LINDLEY and HUTTON, *Fossil Flora*, vol. ii., pl. cxlvii., 1835.

† In the Collection of the Geological Society, London.

1829. *Sphenopteris stricta*, Brongt., *Hist. d. végét. foss.*, p. 208, pl. xlviii. fig. 2.
 1832. *Sphenopteris crithmifolia*, L. and H., *Fossil Flora*, vol. i. p. xlvi.
 1877. *Sphenopteris*, sp., Lebour, *Illustr. of Fossil Plants*, pls. xxxiv., xxxv., xxxvi.
Asplenoides obtusum, König., *Icones foss. sectiles*, pl. xvi. fig. 199.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Shale over Main Coal.

Remark.—Apparently plentiful, but it appeared to be restricted to a single layer.

Mariopteris, Zeiller.

Mariopteris muricata, Schloth., sp.

1804. Schlotheim, *Flora d. Vorwelt*, pp. 54, 55, pl. xii. figs. 21 and 23.
 1820. *Filicites muricatus*, Schlotheim, *Petrefactenkunde*, p. 409.
 1826. *Pecopteris muricata*, Sternb., *Essai flore monde prim.*, vol. i. fasc. iv. p. xviii.
 1832. *Pecopteris muricata*, Brongt., *Hist. d. végét. foss.*, p. 352, pl. xcv. figs. 3-4, pl. xcvi.
 1848. *Pecopteris muricata*, Sauveur, *Végét. foss. d. terr. houil. Belgique*, pl. xliii. fig. 1, pl. xlv. fig. 2.
 1876. *Pecopteris muricata*, Heer, *Flora foss. Helv.*, Lief. i. p. 33, pl. xv. fig. 3.
 1836. *Alethopteris muricata*, Göpp., *Syst. fil. foss.*, p. 313.
 1854. *Alethopteris muricata*, Ett., *Steinkohl. v. Radnitz*, p. 43, pl. xiv. fig. 1.
 1869. *Alethopteris muricata*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 78, pl. xi. fig. 1.
 1876. *Sphenopteris muricata*, Feistmantel, *Vers. d. Böhm. Kohlenab.*, p. 281, pl. lxv. fig. 3 (*excl. syn. Sph. acutifolia*).
 1877. *Diplothmema muricatum*, Stur, *Culm Flora*, Heft ii. p. 230.
 1885. *Diplothmema muricatum*, Stur, *Farne d. Carbon-Flora d. Schatz. Schichten*, p. 393, pl. xxi. figs. 1-5, pl. xxii. figs. 1-5, pl. xxiii. figs. 1-6.
 1878. *Mariopteris muricata*, Zeiller, *Végét. foss. d. terr. houil.*, p. 71, pl. clxvii. fig. 5.
 1879. *Mariopteris muricata*, Zeiller, *Bull. Soc. Géol. d. France*, 3^e sér., vol. vii. p. 92.
 1886. *Mariopteris muricata*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 173, pl. xx. figs. 2-3, pl. xxi. fig. 1, pl. xxii. fig. 2.
 1899. *Mariopteris muricata*, Zeiller, *Mém. Soc. Géol. d. France. Paléont., Mém.* 21, *Flore foss. bassin houil. d'Héracleé*, p. 32, pl. ii. figs. 14-15.
 1899. *Mariopteris muricata*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 140, fig. 135.
 1899. *Mariopteris muricata*, Hofmann and Ryba, *Leitpflanzen*, p. 44, pl. vi. figs. 5 and 16.
 1901. *Mariopteris muricata*, Kidston, *Proc. York. Geol. and Polytech. Soc.*, vol. xiv. pp. 195, 219, pl. xxxii. figs. 1, 1a.
 1886. *Mariopteris muricata forma nervosa*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 173, pl. xx. fig. 1, pl. xxii. fig. 1, pl. xxiii. fig. 1.
 1886. *Mariopteris muricata*, var. *hirta*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 182, pl. xx. fig. 4.
 1879. *Pseudopecopteris muricata*, Lesqx., *Coal Flora*, vol. i. p. 203, pl. xxxvii. fig. 2.
 1832. *Pecopteris nervosa*, Brongt., *Hist. d. végét. foss.*, p. 297, pl. xciv., pl. xcv. figs. 1-2.
 1833. *Pecopteris nervosa*, L. and H., *Fossil Flora*, vol. ii. pl. xciv.
 1848. *Pecopteris nervosa*, Sauveur, *Végét. foss. d. terr. houil. Belgique*, pl. xlv. fig. 1.
 1869. *Pecopteris nervosa*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 513, pl. xxx. figs. 6-7.
 1876. *Pecopteris nervosa*, Heer, *Flora foss. Helv.*, Lief. i. p. 33, pl. xv. figs. 1-2.
 1882. *Pecopteris nervosa*, Weiss, *Aus d. Steink.*, p. 17, pl. xvi. fig. 98 (zweiter abdr.).
 1882. *Pecopteris nervosa*, Acheppohl, *Niederrh. Westfäl. Steink.*, pp. 74, 76, 90, pl. xxii. fig. 6, pl. xxiii. fig. 14, pl. xxviii. figs. 10-14.
 1878. *Mariopteris nervosa*, Zeiller, *Végét. foss. d. terr. houil.*, p. 69, pl. clxvii. figs. 1-4.
 1879. *Mariopteris nervosa*, Zeiller, *Bull. Soc. Géol. d. France*, 3^e sér., vol. vii. p. 97, pl. v. figs. 1-2.

1899. *Mariopteris nervosa*, Hofmann and Ryba, *Leitpflanzen*, p. 44, pl. vii. fig. 7.
 1836. *Alethopteris nervosa*, Göpp., *Syst. fil. foss.* p. 312.
 1855. *Alethopteris nervosa*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 30, pl. xxxiii. figs. 2-3.
 1869. *Alethopteris nervosa*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 77, pl. xxxi. fig. 7.
 1881. *Alethopteris nervosa*, Achepohl, *Niederrh. Westfäl. Steink.*, pp. 57, 64, pl. xvi. fig. 1, pl. xviii. figs. 15, 16.
 1877. *Diplothemema nervosum*, Stur, *Culm Flora*, Heft ii. p. 230.
 1885. *Diplothemema nervosum*, Stur, *Carbon-Flora d. Schatz. Schichten*, vol. i. p. 384, pl. xxiv. fig. 1, pl. xxv. b fig. 2.
 1888. *Diplothemema nervosum*, Toula, *Die Steinkohlen*, p. 188, pl. i. figs. 12-13.
 1879. *Pseudopecopteris nervosa*, Lesqx., *Coal Flora*, vol. i. p. 197, pl. xxxiv. fig. 1 (? figs. 2-3).
 1832. *Pecopteris Sauveuri*, Brongt., *Hist. d. végét. foss.*, p. 299, pl. xcv. fig. 5.
 1836. *Alethopteris Sauveuri*, Göpp., *Syst. fil. foss.*, p. 311.
 1885. *Diplothemema Sauveuri*, Stur, *Farne d. Carbon-Flora d. Schatz. Schichten*, vol. i. p. 380, pl. xxiv. fig. 2-4.
 1899. *Mariopteris Sauveuri*, Frech, *Lethæa. geog.*, vol. ii., Lief. ii., *Steinkf.*, pl. l.a. fig. 6.
 1826. *Pecopteris incisa*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xx; vol. ii. fasc. 5-6, pl. xxii. fig. 3, fasc. 7-8, p. 156.
 1834. *Pecopteris laciniata*, L. and H., *Fossil Flora*, vol. ii., pl. cxxii.
 1877. *Pecopteris laciniata*, Lebour, *Illustr. of Fossil Plants*, p. 59, pl. xxix.
 1838. *Alethopteris Linleyana*, Presl., in Sternb., *Vers.*, vol. ii. fasc. 7-8, p. 145.
 1848. *Pecopteris heterophylla*, Sauveur (non Brongt.), *Végét. foss. terr. houil. Belgique*, pl. xlvii.
 1854. *Sphenopteris acutifolia*, Ett. (non Brongt.), *Steinkf. v. Radnitz*, p. 39, pl. xiv. fig. 2.
 1862. *Pecopteris subnervosa*, Roemer, *Palæont.*, vol. ix. p. 36, pl. viii. fig. 11.
 1869. *Pecopteris subnervosa*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 90, pl. xiii. fig. 5.
 1877. *Sphenopteris macilentia*, var. Lebour., (non L. and H.), *Illustr. of Fossil Plants*, p. 39, pl. xix.
 1877. *Neuropteris heterophylla*, Lebour (non Brongt.), *ibid.*, p. 29, pl. xiv.
 1877. *Neuropteroid frond*, Lebour, *ibid.*, p. 31, pl. xv.
 1877. *Pecopteris (Alethopteris) aquilina*, Lebour (non Schloth.), *ibid.*, p. 33, pl. xvi.
 1877. *Pecopteris (Alethopteris) marginata*, Lebour (non Brongt.), *ibid.*, p. 35, pl. xvii.
 1877. *Pecopteris serra*, Lebour (non L. and H.), *ibid.*, pl. xxii.
 1882. *Odontopteris*, Achepohl, *Niederrh. Westfäl. Steink.*, pp. 93, 95, pl. xxxi. fig. 2, pl. xxxiii. figs. 4-5.
 1882. *Odontopteris dentiformis*, Achepohl, *ibid.*, p. 93, pl. xxxi. fig. 6.
 1882. *Odontopteris Reichiana*, Achepohl (non Gutbier), *ibid.*, p. 95, pl. xxxii. figs. 6-9.
 1883. *Alethopteris conferta*, Achepohl (non Sternb.), *ibid.*, p. 117, pl. xxxv. fig. 10.
 1883. *Alethopteris acuta*, Achepohl, *ibid.*, p. 118, pl. xxxvi. fig. 6.
 1885. *Diplothemema hirtum*, Stur, *Die Farne d. Carbon-Flora d. Schatz.-Schichten*, p. 372, pl. xxxiv. fig. 1.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

— Alethopteris, Sternberg.

Alethopteris lonchitica, Schloth., sp.

1709. Scheuchzer, *Herbarium diluvianum*, p. 11, pl. i. fig. 4.
 1804. Schlottheim, *Flora d. Vorwelt*, p. 55, pl. xi. fig. 22.

1809. *Filicites (striatus)*, Martin, *Petrificata Derbiensia*, expl. to pl. x. figs. 1-4.
 1820. *Filicites lonchiticus*, Schloth., *Petrefactenkunde*, p. 411.
 1828. *Pecopteris lonchitica*, Brongt., *Prodrome*, p. 57.
 1832 or 1833. *Pecopteris lonchitica*, Brongt., *Hist. d. végét. foss.*, p. 275, pl. lxxxiv. figs. 1-7.
 1835. *Pecopteris lonchitica*, L. and H., *Fossil Flora*, vol. ii., pl. cliii.
 1848. *Pecopteris lonchitica*, Sauveur (pars), *Végét. foss. terr. houil. Belgique*, pl. xli. figs. 1-2, pl. xlii. fig. 5 (non fig. 4).
 1826. *Alethopteris lonchitidis*, Sternb., *Vers.*, i. fasc. iv. p. xxi; *Vers.*, ii. fasc. vii.-viii. p. 142.
 1854. *Alethopteris lonchitidis*, Geinitz, *Flora d. Hainich-Ebersdorfer*, p. 43, pl. xiv. figs. 1-2.
 1860. *Alethopteris lonchitidis*, Eichwald, *Lethæa Rossica*, vol. i. p. 85, pl. ii. fig. 3.
 1869. *Alethopteris lonchitidis*, Roehl (pars), *Foss. Flora d. Steink.-Form. Westph.*, p. 72, pl. xiv. fig. 2, pl. xxxi. fig. 4.
 1881. *Alethopteris lonchitidis*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 33, pl. viii. figs. 1, 11.
 1842. *Alethopteris lonchitica*, Unger, *Neues Jahrb.*, p. 608.
 1869. *Alethopteris lonchitica*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 554 (refs. in part).
 1879. *Alethopteris lonchitica*, Lesqx., *Coal Flora*, vol. i. p. 177, pl. xxviii. fig. 7 (refs. in part).
 1879. *Alethopteris lonchitica*, Schimper, in Zittel, *Handb. d. palæont. Palæophyt.*, p. 118, fig. 93 (1).
 1883. *Alethopteris lonchitica*, Renault, *Cours. d. botan. foss.*, vol. iii. p. 156, pl. xxvii. figs. 5-6.
 1886. *Alethopteris lonchitica*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 225, pl. xxxi. fig. 1.
 1894. *Alethopteris lonchitica*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxvii. p. 594.
 1899. *Alethopteris lonchitica*, Hofmann and Ryba, *Leitpflanzen*, p. 55, pl. viii. fig. 1, 1a.
 1901. *Alethopteris lonchitica*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. pp. 195, 219, pl. xxxii. figs. 2-3.
 1826. *Alethopteris vulgator*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xxxi, pl. liii. fig. 2; ii. fasc. 7-8, p. 142.
 1828. *Pecopteris blechnoides*, Brongt., *Prodrome*, p. 56.
 1832 or 1833. *Pecopteris urophylla*, Brongt., *Hist. d. végét. foss.*, p. 290, pl. lxxxvi.
 1838. *Alethopteris urophylla*, Sternb., *Vers.*, ii. fasc. 7-8, p. 143.
 1869. *Alethopteris urophylla*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 75, pl. xxii. fig. 7.
 1836. *Alethopteris Sternbergii*, Göpp., *Syst. fil. foss.*, p. 295.
 1854. *Alethopteris Sternbergii*, Ett., *Steinkf. v. Radnitz*, p. 42, pl. xviii. fig. 4.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of Main Coal.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with Five-foot Coal.

Neuropteris, Brongniart.

Neuropteris heterophylla, Brongt.

1709. *Lithosmunda minor*, Scheuchzer, *Herb. diluv.*, p. 15, pl. iv. fig. 3.
 1760. *Lithosmunda minor*, Luid., *Lith. Brit. Ichnographia*, p. 12, pl. iv. fig. 189.
 1809. *Phytolithus (osmundæ regalis)*, Martin, *Petrificata Derbiensia*, pl. xix. figs. 1-3.
 1822. *Filicites (Neuropteris) heterophyllus*, Brongt., *Class. d. végét. foss.*, p. 33, pl. ii. fig. 6a and 6b.
 1828. *Neuropteris heterophylla*, Brongt., *Prodrome*, p. 53.
 1830. *Neuropteris heterophylla*, Brongt., *Hist. d. végét. foss.*, p. 243, pl. lxxi., pl. lxxii. fig. 2.
 1833. *Neuropteris heterophylla*, Sternb., *Essai flore monde prim.*, vol. ii. fasc. 5-6, p. 72.
 1837. *Neuropteris heterophylla*, L. and H., *Fossil Flora*, vol. iii., pl. cc. (non pl. clxxxiii.).
 1848. *Neuropteris heterophylla*, Sauveur, *Végét. Foss. d. terr. houil. Belgique*, pl. xxix. figs. 3-4, pl. xxx. figs. 1-2.

1869. *Neuropteris heterophylla*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 37, pl. xvi. figs. 5, 7.
1876. *Neuropteris heterophylla*, Heer (*pars*), *Flora foss. Helv.*, Lief. i. p. 23, pl. iv. figs. 1-2 (? fig. 3, pl. v. fig. 4 (*non* pl. xii. fig. 10b).
1880. *Neuropteris heterophylla*, Zeiller, *Végét. foss. d. terr. houil.*, p. 49, pl. clxiv. fig. 1 (*non* fig. 2).
1882. *Neuropteris heterophylla*, Weiss, *Aus d. Steink.*, p. 15, pl. xiv. fig. 88 (*zweiter abdr.*).
1883. *Neuropteris heterophylla*, Renault, *Cours d. botan. foss.*, vol. iii. p. 170, pl. xxix. figs. 6-7.
1886. *Neuropteris heterophylla*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 261, pl. xliii. figs. 1-2, pl. xliv. fig. 1.
1887. *Neuropteris heterophylla*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 150, pl. viii. fig. 7.
1888. *Neuropteris heterophylla*, Zeiller, *Flore foss. terr. houil. d. Commeny*, part i. p. 257, pl. xxix. fig. 4.
1890. *Neuropteris heterophylla*, Zeiller, *Flore foss. bassin houil. et perm. d'Autun et d'Épinac*, p. 142, pl. xii. fig. 1.
1891. *Neuropteris heterophylla*, Kidston, *Trans. Geol. Soc. Glasgow*, vol. ix. p. 34, pl. iii. fig. 36.
1899. *Neuropteris heterophylla*, Zeiller, *Flore foss. d. bassin houil. d'Héracle*, p. 44.
1899. *Neuropteris heterophylla*, Hofmann and Ryba, *Leitpflanzen*, p. 64, pl. ix. fig. 6, 6a, 7-10.
1900. *Neuropteris heterophylla*, Zeiller, *Éléments de paléobot.*, p. 52, fig. 18, p. 107, fig. 81.
1830. *Neuropteris Loshii*, Brongt., *Hist. d. végét. foss.*, p. 242, pl. lxxii. fig. 1, pl. lxxiii.
1832. *Neuropteris Loshii*, L. and H., *Fossil Flora*, vol. i., pl. xlix. (*fig. inaccurate*).
1835. *Neuropteris Loshii*, Gutbier, *Vers. d. Zwick. Schwarz*, p. 55, pl. viii. fig. 6.
1848. *Neuropteris Loshii*, Sauveur, *Végét. foss. d. terr. houil. Belgique*, pl. xxxi. figs. 1-2.
1864. *Neuropteris Loshii*, Sandberger, *Flora d. ober. Steink. im badischen Schwarz*, p. 6, pl. iv. fig. 1.
1869. *Neuropteris Loshii*, Roehl, *Flora d. Steink.-Form. Westph.*, p. 37, pl. xvii.
1876. *Neuropteris Loshii*, Feistmantel, *Vers. d. böhm. Kohlenab.*, Abth. iii. p. 64, pl. xvii. fig. 3.
1880. *Neuropteris Loshii*, Lesqx., *Coal Flora*, vol. i. p. 98 (? pl. xi. figs. 1-4).
1830. *Cyclopteris trichomanoides*, Brongt., *Hist. d. Végét. foss.*, p. 217, pl. lxi. *bis*, fig. 4.
1835. *Cyclopteris trichomanoides*, Gutbier, *Vers. d. Zwick. Schwarz*, p. 45, pl. vi. fig. 1.
1855. *Cyclopteris trichomanoides*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 23, pl. xxviii. figs. 2-3.
1869. *Cyclopteris trichomanoides*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 44, pl. xvii. (? pl. xxix. fig. 10).
1883. *Cyclopteris trichomanoides*, Renault, *Cours d. botan. foss.*, vol. iii. p. 184, pl. xxx. fig. 5.
1888. *Cyclopteris trichomanoides*, Zeiller, *Flore foss. terr. houil. d. Commeny*, part i. p. 265, pl. xxiii. fig. 3.
1832. *Pecopteris adiantoides*, L. and H., *Fossil Flora*, vol. i., pl. xxxvii (*fig. inaccurate*).
1833. *Neuropteris Brongniarti*, Stern., *Essai flore monde prim.*, vol. ii. fasc. v.-vi. p. 72.
1830. *Cyclopteris obliqua*, Brongt., *Hist. d. végét. foss.*, p. 221, pl. lxi. fig. 3.
1833. *Cyclopteris obliqua*, L. and H., *Fossil Flora*, vol. ii. p. 25, pl. xc. A-B.
1835. *Cyclopteris inæqualis*, Gutbier, *Vers. d. Zwick. Schwarz*, p. 46, pl. vi. fig. 3.
1836. *Adiantites trichomanoides*, Göpp., *Syst. fil. foss.*, p. 220.
1836. *Adiantites obliquus*, Göpp., *Syst. fil. foss.*, p. 221.
1840. *Cyclopteris semiplatelliformis*, Morris, in *Prestwick*, *Trans. Geol. Soc. London*, 2nd ser., vol. v. p. 488, pl. xxxviii. fig. 7.
1848. *Otopteris cycloidea*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xxvi. figs. 1-2 (?), pl. xxviii. fig. 3?
1848. *Otopteris reniformis*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xxvi. fig. 3.
1862. *Odontopteris oblongifolia*, Roemer, *Palæontographica*, vol. ix. p. 31, pl. vii. fig. 1.
1869. *Odontopteris oblongifolia*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 43, pl. vii. fig. 1.
1869. *Odontopteris obtusiloba*, Roehl (*non* Naumann), *Foss. Flora d. Steink.-Form. Westph.*, p. 42, pl. xvi. figs. 12-15.
1869. *Odontopteris britannica*, Roehl (*non* Gutbier) (*pars*), *Foss. Flora d. Steink.-Form. Westph.*, p. 41, pl. xx. fig. 4.

Remarks.—M. GRAND'EURY suggests that *Cyclopteris trichomanoides*, Brongt., is founded on the large circular pinnules or foliar stipules of *Odontopteris minor*, Brongt.,

and *Odontopteris Reichiana*, Gutbier, with which he finds them associated.* M. ZEILLER, on the other hand, would refer *Cyclopteris trichomanoides* exclusively to *Odontopteris minor*, Brongt., as *Odontopteris Reichiana*, Gutbier, does not occur in the beds in which he finds the *Cyclopteris*.†

In Britain, *O. minor*, Brongt., has not yet been discovered, and *O. Reichiana*, Gutbier, is very rare, whereas *Cyclopteris trichomanoides* is very common, and almost invariably in the beds in which *Neuropteris heterophylla*, Brongt., occurs, and to which species I believe the British specimens of *Cyclopteris trichomanoides* should without doubt be referred. To the localities to which I refer, and in which the *C. trichomanoides* is especially abundant, the genus *Odontopteris* does not occur. The excellent specimen of *Neuropteris heterophylla* figured by ROEHL under the name of *Neuropteris Loshii* shows the cyclopteroid pinnules in position on the rachis.‡

The true explanation of this difference of opinion may perhaps be, that several species bore rachial cyclopteroid pinnules, which, when removed from the parent frond, cannot be specifically distinguished.

Cyclopteris trichomanoides, Brongt., and *Cyclopteris obliqua*, Brongt., are both shown on the specimen figured by ROEHL, the oblique form of *C. obliqua* arising from its position and mode of insertion on the rachis.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shales associated with *Five-foot Coal*.

Neuropteris gigantea, Sternberg.

- 1823. *Osmunda gigantea*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 2, pp. 32, 37, pl. xxii.
- 1826. *Neuropteris gigantea*, Sternb., *Essai flore monde prim.*, vol. i. fasc. iv. p. xvi.
- 1830. *Neuropteris gigantea*, Brongt., *Hist. d. végét. foss.*, p. 240, pl. lxix.
- 1832. *Neuropteris gigantea*, L. and H., *Fossil Flora*, vol. i. pl. lii.
- 1848. *Neuropteris gigantea*, Sauv. Végét. foss. d. terr. houil. Belgique, pl. xxxiii. fig. 1 (non pl. xxxi. figs. 3-4).
- 1886. *Neuropteris gigantea*, Zeiller, *Flore Foss. bassin houil. d. Valen.*, p. 258, pl. xlii. fig. 1.
- 1892. *Neuropteris gigantea*, Potonié, *Ueber einige Carbonfarne*, iii. Theil, p. 22, text, figs. 1-4, pl. ii. figs. 1-2, pl. iii. figs. 1-4, pl. iv. figs. 1-2. (*Jahrb. d. k. preuss. geol. Landesanstalt* for 1891.)
- 1899. *Neuropteris gigantea*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 113, fig. 101, p. 118, fig. 105, p. 153, fig. 150.
- 1899. *Neuropteris gigantea*, Hofmann and Ryba (*pars*), *Leitpflanzen*, p. 64, pl. ix. figs. 4, 4a-4d (non pl. viii. fig. 14, pl. ix. fig. 3).
- 1899. *Neuropteris gigantea*, Zeiller, *Flore foss. d. bassin houil. d. Héraclée*, p. 44, pl. iv. fig. 10.
- 1900. *Neuropteris gigantea*, Zeiller, *Éléments d. paléobot.*, p. 105, fig. 79.
- 1901. *Neuropteris gigantea*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. pp. 193, 211, 213, pl. xxviii. fig. 3, pl. xxix. fig. 4.

* *Flore Carbon d. Départ. d. l. Loire et d. Centre d. l. France*, p. 113.

† *Flore foss. terr. houil. d. Commeny*, p. 266.

‡ Roehl, *Foss. Flora d. Steink.-Form. Westph.*, pl. xvii.

1848. *Neuropteris flexuosa*, Sauveur (*non* Sternberg.), *Végét. foss. d. terr. houil. Belgique*, pl. xxxii. figs. 1-2 (? pl. xxxiii. fig. 2).
 1892. *Neuropteris Zeilleri*, Potonié, *Ueber einige Carbonfarne*, iii. Theil, pp. 22, 32, fig. 5.
 1899. *Neuropteris pseudogigantea*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 113, fig. 102.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Neuropteris Blissii, Lesquereux.

1884. *Neuropteris Blissii*, Lesqx., *Coal Flora*, vol. iii. p. 737, pl. xcv. figs. 1, 1a.
 1888. *Neuropteris Blissii*, Zeiller, *Flore foss. terr. houil. d. Commeny*, part i. p. 243, pl. xxviii, figs. 3-6.
 1893. *Neuropteris Blissii*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxvii. p. 329, pl. i. figs. 3, 3a.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Neuropteris obliqua, Brongniart, sp.

1832. *Pecopteris obliqua*, Brongt., *Hist. d. végét. foss.*, p. 320, pl. xvi. figs. 1-4.
 1838. *Alethopteris obliqua*, Presl., in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 144.
 1874. *Odontopteris obliqua*, Stur, *Verhandl. der k. k. geol. Reichsanstalt*, No. 4, p. 80.
 1883. *Odontopteris obliqua*, Zeiller, *Bull. Soc. Géol. d. France*, 3^e ser., vol. xii. p. 198.
 1886. *Neuropteris obliqua*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 284, pl. xlviii. figs. 1, 2 (! fig. 3), figs. 4-7.
 1893. *Neuropteris obliqua*, Arber, *Quart. Journ. Geol. Soc.*, vol. lix. p. 4, pl. i. fig. 2.
 1883. *Odontopteris binervosa*, Achepohl, *Niederrh. Westfäl. Steinkohl.*, p. 118, pl. xxxvi. fig. 5.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Equisetaceæ.

Calamites, Suckow.

Group I.—Calamitina, Weiss.

Calamites (Calamitina) undulatus, Sternberg.

1826. *Calamites undulatus*, Sternb., *Ess. fl. monde prim.*, vol. i. fasc. 4, p. xxvi.; vol. ii. fasc. 5-6, p. 47, pl. i. fig. 2 (? pl. xx. fig. 8).
 1828. *Calamites undulatus*, Brongt., *Hist. d. végét. foss.*, p. 127, pl. xvii. figs. 1-4.
 1848. *Calamites undulatus*, Sauveur, *Végét. foss. d. terr. houil. Belgique*, pl. v. figs. 1-3, pl. viii. fig. 1.

1873. *Calamites undulatus*, Dawson, *Fossil Plants Low. Carb. and Millstone Grit Form. Canada*, p. 30, pl. viii. fig. 68 (? figs. 66, 67, 69–73).
 1886. *Calamites undulatus*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 338, pl. liv. figs. 1, 4.
 1888. *Calamites undulatus*, Seward, *Geol. Mag.*, Dec. iii., vol. v. p. 289, pl. ix.
 1822. *Calamites decoratus*, Brongt. (*non* Schlotheim), *Class. végét. foss.*, pp. 17, 89, pl. i. fig. 2.
 1828. *Calamites decoratus*, Brongt. (*pars*), *Hist. d. végét. foss.*, p. 423, pl. xiv. figs. 3–4 (*non* figs. 1–2).
 1828. *Calamites decoratus*, Bischoff, *Kryptogam. Gewächse.*, pp. 51, 60, pl. vi. fig. 11.
 1854. *Calamites communis*, Ett. (*pars*), *Steinkf. v. Radnitz*, p. 24, pl. iii. figs. 1 and 3, pl. iv. figs. 1 and 3.
 1869. *Calamites cannaeformis*, Roehl (*pars*) (*non* Schlotheim), *Foss. Flora d. Steink.-Form. Westph.*, p. 12, pl. ii. fig. 3.
 1874. *Calamites cannaeformis*, Feistmantel (*pars*) (*non* Schlotheim), *Vers. d. Böhm. Ablag.*, i. Abth. p. 109, pl. vii. fig. 3.
 1883. *Calamites inæquus*, Achepohl, *Niederrh. Westfäl. Steinkohl.*, p. 114, pl. xxxiv. fig. 15.
 1883. *Calamites duplex*, Achepohl, *ibid.*, p. 135, pl. xli. fig. 11.
 1884. *Calamites* (*Stylocalamites*) *Suckowii*, var. *undulatus*, Weiss, *Steinkohlen Calamarien*, part ii. pp 129, 134, 135, pl. xvii. fig. 4.
 1890. *Stylocalamites undulatus*, Kidston, *Trans. York. Nat. Union*, part xiv. p. 20.
 1893. *Calamitina undulata*, Kidston, *Trans. York. Nat. Union*, part xviii. p. 99.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Shale above *Nine-foot Coal*.

Group III.—*Stylocalamites*, Weiss.

Calamites (*Stylocalamites*) *Cistii*, Brongt.

1828. *Calamites Cistii*, Brongt., *Hist. d. végét. foss.*, p. 129, pl. xx.
 1855. *Calamites Cistii*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 7 (? *non* pl. xi. figs. 7–8, pl. xii. figs. 4–5, pl. xiii. fig. 7).
 1876. *Calamites Cistii*, Heer, *Flora foss. Helv.*, Lief. i. p. 47, pl. xx. fig. 3 (? *non* figs. 1, 2, 4).
 1877. *Calamites Cistii*, Grand' Eury, *Flore Carbon. d. Départ. de la Loire*, p. 19, pl. ii. figs. 2, 3 (? fig. 1).
 1882. *Calamites Cistii*, Renault, *Cours d. botan. foss.*, vol. ii. p. 162, pl. xxiv. fig. 7.
 1886. *Calamites Cistii*, Zeiller, *Flore foss. d. bassin houil. d. Valen.*, p. 242, pl. lvi. figs. 1–2.
 1890. *Calamites Cistii*, Grand' Eury (? *pars*), *Géol. et paléont. du bassin houil. du Gard*, p. 217, pl. xv. fig. 1 (?).
 1890. *Calamites Cistii*, Renault, *Flore foss. terr. houil. de Commeny*, part ii. p. 389, pl. xliii. fig. 4 (? pl. xlv. fig. 1), pl. lvii. fig. 4.
 1899. *Calamites Cistii*, Hofmann and Ryba, *Leitpflanzen*, p. 25, pl. i. fig. 11.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

Calamites, sp.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Sphenophyllaceæ.

Sphenophyllum, Brongniart.

Sphenophyllum cuneifolium, Sternberg., sp.

1823. *Rotularia cuneifolia*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 2, pp. 33, 37, pl. xxvi. figs. 4a, 4b.
1880. *Sphenophyllum cuneifolium*, Zeiller, *Végét. foss. du terr. houil.*, p. 30, pl. clxi. figs. 1-2.
1882. *Sphenophyllum cuneifolium*, Renault, *Cours d. botan. foss.*, vol. ii. p. 87, pl. xiii. fig. 10.
1886. *Sphenophyllum cuneifolium*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 413, pl. lxii. fig. 1, pl. lxiii. figs. 1-10.
1893. *Sphenophyllum cuneifolium*, Zeiller, *Mém. Soc. géol. d. France, Paléont.*, vol. iv. No. 11, p. 12, pl. i. (iii.) figs. 1-4, pl. ii. (iv.) figs. 1-3, pl. iii. (v.) figs. 1-2.
1894. *Sphenophyllum cuneifolium*, Potonié, *Bericht. d. Deutschen bot. Gesell.*, vol. xii. Heft 4, p. 99, fig. 3.
1899. *Sphenophyllum cuneifolium*, Zeiller, *Étude sur la flore foss. d. bassin houil. d'Héraclée*, p. 56, pl. vi. figs. 6-7.
1899. *Sphenophyllum cuneifolium*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 176, fig. 172.
1900. *Sphenophyllum cuneifolium*, Zeiller, *Éléments de paléobot.*, p. 139, fig. 100.
1901. *Sphenophyllum cuneifolium*, Kidston, *Trans. Nat. Hist. Soc. Glasgow*, vol. vi. (new series), p. 124, fig. 21a-b, p. 121.
1902. *Sphenophyllum cuneifolium*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. p. 360, fig. 12 a-b.
1826. *Rotularia saxifragæfolium*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xxxii., pl. lv. fig. 4.
1848. *Sphenophyllum saxifragæfolium*, Göpp., in *Bronn, Index palæont.*, p. 1166.
1854. *Sphenophyllum saxifragæfolium*, Geinitz, *Flora d. Hainichen-Ebersdorfer*, p. 37, pl. xiv. figs. 7-10.
1855. *Sphenophyllum saxifragæfolium*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 13, pl. xx. figs. 8, 8a, (? figs. 9, 10).
1869. *Sphenophyllum saxifragæfolium*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 31, pl. iv. fig. 17 (? pl. iii. fig. 2c).
1880. *Sphenophyllum saxifragæfolium*, Zeiller, *Végét. foss. d. terr. houil.*, p. 31, pl. clxi. figs. 3-6.
1882. *Sphenophyllum saxifragæfolium*, Renault, *Cours d. botan. foss.*, vol. ii. p. 87, pl. xiii. figs. 11-14.
1882. *Sphenophyllum saxifragæfolium*, Weiss, *Aus d. Steink.*, p. 12, pl. x. fig. 62 (zweiter abdr.).
1826. *Rotularia polyphylla*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, pp. xxxii and 47, pl. l. fig. 4.
1826. *Rotularia pusilla*, Sternb., *Essai flore monde prim.*, vol. i. fasc. iv. p. xxxii.
1828. *Sphenophyllum pusillum*, Bischoff, *Die Kryptogram. Gewächse*, p. 90, pl. xiii. fig. 3.
1848. *Sphenophyllum pusillum*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxiv. fig. 4.
1831. *Sphenophyllum erosum*, L. and H., *Fossil Flora*, vol. i. pl. xiii.
1847. *Sphenophyllum erosum*, Bunbury, *Quart. Journ. Geol. Soc.*, vol. iii. p. 430, pl. xxiii. fig. 3a-b.
1864. *Sphenophyllum erosum*, Cœmans and Kickx., *Bull. Acad. Roy. Belgique*, vol. xviii. p. 149, pl. i. figs. 5 a, b, c.
1868. *Sphenophyllum erosum*, Dawson, *Acad. Geol.*, 2nd. ed. p. 480, fig. 165 c, c', p. 444.
1869. *Sphenophyllum erosum*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 30, pl. iv. fig. 19.
1869. *Sphenophyllum erosum*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 341, pl. xxv. figs. 10-14.
1876. *Sphenophyllum erosum*, Heer, *Flora foss. Helv.*, 1 Lief. p. 53, pl. xix. figs. 11-13 (non fig. 14).

1880. *Sphenophyllum erosum*, Schimper, in *Zittel, Handb. d. palæont.*, Abth. ii. p. 179, fig. 135 (3 and 4).
1882. *Sphenophyllum erosum*, Weiss, *Aus d. Steink.*, p. 12, pl. x. fig. 57 (zweiter abdr.).
1888. *Sphenophyllum erosum*, Dawson, *Geol. Hist. of Plants*, p. 122, fig. 45 c, c'.
1891. *Sphenophyllum erosum*, Newberry, *Journ. Cincinnati Soc. Nat. Hist.*, vol. xiii. p. 215, pl. xix. fig. 1.
1864. *Sphenophyllum erosum*, var. *saxifragæfolium*, Coemans and Kickx., *Bull. Acad. Roy. Belgique*, vol. xviii. p. 151, pl. i. fig. 6 a, b, c, d.
1831. *Rotularia dichotoma*, Germar and Kaulfuss, *Act. Acad. Nat. Curios*, vol. xv. p. 226, pl. lxvi. fig. 4.
1850. *Sphenophyllum dichotomum*, Unger, *Genera et Species*, p. 71.
1887. *Sphenophyllum dichotomum*, Stur, *Calamarien d. Schatzlärer Schicht.*, p. 233, pl. xv. figs. 5 a, b, c, d (?! pl. xiii. b fig. 2 (in lower right angle of figure)).
1888. *Sphenophyllum dichotomum*, Toulà, *Die Steinkohlen*, p. 204, pl. v. fig. 16 (? fig. 21).
1848. *Sphenophyllum multifidum*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxiv. figs. 1-2.
1852. *Sphenophyllum Schlotheimii*, Ett. (non Brongt.), *Steinkf. v. Stralowitz*, p. 6, pl. vi. fig. 6.
1854. *Sphenophyllum Schlotheimii*, Ett. (non Brongt.) (pars), *Steinkf. v. Radnitz*, p. 30, pl. xi. figs. 1-3.
1874. *Sphenophyllum Schlotheimii*, Feistmantel (pars), *Vers. d. böhm. Ablager.*, Abth. 1, p. 133, pl. xviii. fig. 4 (?! figs. 2, 3, 5, 6), pl. xix. figs. 2-3 (?! fig. 1).
1855. *Sphenophyllum emarginatum*, Geinitz (non Brongt.) (pars), *Vers. d. Steinkf. in Sachsen*, p. 12, pl. xx. fig. 6.
1886. *Sphenophyllum emarginatum*, Sterzel (non Brongt.) (pars), *Flora d. Rothl. im Nordw. Sachsen, in Dames und Kayser. Palæont. Abhandl.*, vol. iii. Heft iv., Berlin, p. 23, pp. 26, 27, fig. 9 (? fig. 16).
1877. *Sphenophyllum costatum*, Stur, *Calamarien d. Carbon-Flora d. Schatz. Schicht.*, p. 228, fig. 41, pl. vii. b fig. 5, pl. xiv. b fig. 6, pl. xv. fig. 6.
1888. *Sphenophyllum costatum*, Toulà, *Die Steinkohlen*, p. 204, pl. v. figs. 17-18.
1877. (?! *Calamites Sachsei*, Stur (pars), *Calamarien d. Carbon-Flora d. Schatz. Schicht.*, p. 180, pl. ix. fig. 3, pl. xi. figs. 2-6,
1887. (?! *Sphenophyllum Sachsei*, Stur, *ibid.*, p. 233, fig. 39.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Lycopodiaceæ.

Lepidodendron, Sternberg.

Lepidodendron aculeatum, Sternb.

1820. *Schuppenpflanze*, Rhode, *Beitr. z. Pflanzenkunde d. Vorwelt*, pp. 8, 9, pl. i. figs. 5-6.
1820. *Lepidodendron aculeatum*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 1, pp. 21 and 25, pl. vi. fig. 2, pl. viii. fig. 1 B, a, b; fasc. 2, p. 28, pl. xiv. figs. 1-4; fasc. 4, p. x.
1848. *Lepidodendron aculeatum*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxiii. fig. 4.
1870. *Lepidodendron aculeatum*, Schimper, *Traité d. paléont. végét.*, vol. ii. p. 20, pl. lix. fig. 3, pl. lx. figs. 1-2 (?! fig. 6).
1877. *Lepidodendron aculeatum*, Fairchild (pars), *Ann. New York Acad. Sc.*, vol. i. No. 3, p. 77, pl. v. figs. 1-4, pl. vi. figs. 1-4 (? fig. 5, ? non fig. 6), pl. vii. figs. 1-4 (? figs. 5-6), pl. viii. figs. 1-2 (? figs. 3-6), pl. ix. (? fig. 6, non figs. 1-5, 7).

1879. *Lepidodendron aculeatum*, Lesqx., *Coal Flora*, vol. ii. p. 371, pl. lxiv. fig. 1.
 1882. *Lepidodendron aculeatum*, Renault, *Cours d. botan. foss.*, vol. ii. p. 12, pl. i. fig. 7, pl. vi. fig. 4.
 1836. *Lepidodendron aculeatum*, Zeiller, *Végét. foss. bassin houil. d. Valen.*, p. 435, pl. lxv. figs. 1-7.
 1899. *Lepidodendron aculeatum*, Hofmann and Ryba, *Leitpflanzen*, p. 79, pl. xiv. figs. 8-10 (? fig. 11).
 1899. *Lepidodendron aculeatum*, Zeiller, *Étude sur la flore foss. d bassin houil. d'Héracleé*, p. 72, pl. vi. fig. 6.
 1900. *Lepidodendron aculeatum*, Zeiller, *Éléments de paléobot.* p. 180, fig. 123.
 1902. *Lepidodendron aculeatum*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, pp. 345, 346, fig. 1 ;
 371, pl. li. fig. 1.
 1903. *Lepidodendron aculeatum*, Arber, *Quart. Journ. Geol. Soc.*, vol. lix. p. 7, pl. i. fig. 4.
 1838. *Sagenaria aculeata*, Presl, in *Sternb., Vers.*, vol. ii. fasc. vii.-viii. p. 177, pl. lxviii. fig. 3.
 1875. *Sagenaria aculeata*, Feistmantel (pars), *Vers. d. böhm. Ablager.*, Abth. ii. p. 34, pl. xii. fig. 1
 (? non pl. xi. figs. 3, 4).
 1820. *Lepidodendron crenatum*, Sternb., *Essai flore monde prim.*, vol. i. fasc. i. pp. 22, 25, pl. viii. fig. 2
 B a b ; fasc. iv. p. x.
 1836. *Lepidodendron crenatum*, Göpp., *Syst. fil. foss.*, p. 465, pl. xlii. figs. 4-6.
 1848. *Lepidodendron crenatum*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxiii. fig. 2.
 1869. *Lepidodendron crenatum*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 128, pl. viii. fig. 2.
 1822. *Sagenaria cœlata*, Brongt., *Class. d. végét. foss.*, pp. 24 and 89, pl. i. fig. 6.
 1838. *Sagenaria cœlata*, Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 180.
 1826. *Lepidodendron cœlatum*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xi.
 1848. *Lepidodendron cœlatum*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxi. fig. 5.
 1858. (?) *Lepidodendron conicum*, Lesqx., in *Roger's Geol. of Pennsylv.*, vol. ii. p. 874, pl. xv. fig. 3.
 1858. *Lepidodendron modulatum*, Lesqx., in *Roger's Geol. of Pennsylv.*, vol. ii. p. 874, pl. xv. fig. i.
 1860. *Lepidodendron modulatum*, Lesqx., in *2nd Rept. of a Geol. Reconnaissance of Middle and South
 Counties of Arkansas*, p. 310, pl. iii. figs. 1, 1a.
 1879. *Lepidodendron modulatum*, Lesqx., *Coal Flora*, vol. ii. p. 385, pl. lxiv. figs. 13, 14.
 1860. *Lepidodendron Mekiston*, Wood, *Proc. Amer. Acad. Sc. Philadel.*, p. 239, pl. v. fig. 3.
 1860. *Lepidodendron Lesquereuxi*, Wood, *ibid.*, p. 240, pl. v. fig. 4.
 1860. *Lepidodendron Bordæ*, Wood, *ibid.*, p. 240, pl. vi. fig. 3.
 1860. (?) *Lepidodendron Dikrocheilos*, Wood, *ibid.*, p. 239, pl. vi. fig. i.
 1869. *Lepidodendron uræum*, Wood, *Trans. Amer. Phil. Soc.*, vol. xiii. p. 343, pl. ix. fig. 5.
 1869. *Lepidodendron caudatum*, var. Rhoel (?) Sternberg.), *Foss. Flora d. Steink.-Form. Westph.*, p. 130,
 pl. vi. fig. 7, pl. viii. fig. 7.
 1875. (?) *Sagenaria distans*, Feistmantel, *Vers. d. böhm. Ablager.*, Abth. ii. p. 38, pl. xix. fig. 3.
 1848. *Lepidodendron obovatum*, Sauveur (non Sternb.), *Végét. foss. terr. houil. Belgique*, pl. lxiii. fig. 3.
 1875. *Lepidodendron obovatum*, Feistmantel (non Sternb.) (pars), *Vers. d. böhm. Ablager.*, Abth. ii.
 p. 30, pl. ix. fig. 2
 1899. *Lepidodendron obovatum*, Hofmann and Ryba (non Sternb.) (pars), *Leitpflanzen*, p. 80, pl. xiv.
 figs. 4-5.
 1870. *Lepidodendron Sternbergii*, Schimper (non Brongt.), *Traité d. paléont. végét.*, vol. ii. p. 19, pl. lx.
 figs. 2 and 5.
 1876. *Lepidodendron Sternbergii*, Roemer (non Brongt.), *Lethæa geog.*, vol. i. p. 212, fig. 27, pl. liii
 fig. 3.
 1880. *Lepidodendron Sternbergii*, Schimper (non Brongt.), in *Zittel, Handb. d. palæont.*, ii. Abth. p. 190,
 fig. 140.
 1888. *Lepidodendron Sternbergii*, Toulou (non Brongt.), *Die Steinkohlen*, p. 197, pl. iii. fig. 17.
 1882. *Lepidodendron dichotomum*, Weiss (non Sternb.), *Aus d Steink.*, p. 7, pl. iv. fig. 27 (zweiten abdr.).
 1881. *Lepidodendron dichotomum Ajax*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 54, pl. xv. figs. 1-2.
 1881. *Lepidodendron dichotomum rhombiforme*, Achepohl, *ibid.*, p. 67, pl. xx. fig. 3.
 1882. *Lepidodendron dichotomum transiens*, Achepohl, *ibid.*, p. 92, pl. xxx. fig. 4.
 1883. *Lepidodendron lamellosum*, Achepohl, *ibid.*, p. 134, pl. xl. fig. 15.
 1844. *Lepidodendron*, King, *Edin. New Phil. Journ.*, vol. xxxvi. p. 273, pl. iv. figs. 2, 2x, 4.

Decorticated or Imperfectly Preserved Conditions.

1824. *Lepidodendron appendiculatum*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 3, p. 43, pl. xxviii.; fasc. 4, p. xi.
 1828. *Sigillaria appendiculata*, Brongt., *Prodrome*, p. 64.
 1836. *Sigillaria appendiculata*, Brongt., *Hist. d. végét. foss.*, p. 420, pl. exli. fig. 2.
 1838. *Aspidiaria appendiculata*, Presl, in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 183.
 1825. *Aphyllum cristatum*, Artis, *Antedil. Phyt.*, pl. xvi.
 1838. *Aspidiaria cristata*, Presl, in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 183.
 1848. *Lepidodendron confluent*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxii. fig. 3.
 1875. *Aspidiaria undulata*, Feistmantel, *Vers. d. böhm. Ablag.*, Abth. ii. p. 31 (? pl. x. figs. 1-4), pl. xi. fig. 1 (non fig. 2).

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

Lepidodendron obovatum, Sternberg.

1820. *Lepidodendron obovatum*, Sternb., *Essai flore monde prim.*, vol. i. fasc. i. pp. 21, 25, pl. iv. fig. 1, pl. viii. fig. 1 A, a, b; fasc. 4, p. x.
 1832. *Lepidodendron obovatum*, L. and H., *Fossil Flora*, vol. i. pl. xix.
 1869. *Lepidodendron obovatum*, Roehl (*pars*), *Foss. Flora d. Steink.-Form. Westph.*, p. 129, pl. viii. fig. 8b.
 1879. *Lepidodendron obovatum*, Lesqx., *Atlas to Coal Flora*, p. 12, pl. lxiv. fig. 3.
 1882. *Lepidodendron obovatum*, Renault, *Cours d. botan. foss.*, vol. ii. p. 13, pl. vi. fig. 5.
 1886. *Lepidodendron obovatum*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 442, pl. lxvi. figs. 1-8.
 1888. *Lepidodendron obovatum*, Toulal, *Die Steinkohlen*, p. 196, pl. iii. fig. 8.
 1899. *Lepidodendron obovatum*, Hofmann and Ryba (*pars*), *Leitpflanzen*, p. 80, pl. xiv. figs. 6, 6a, pl. xv. fig. 1.
 1899. *Lepidodendron obovatum*, Zeiller, *Étude sur la flore foss. bassin houil. d'Héracle*, p. 73, pl. vi. fig. 11.
 1838. *Sagenaria obovata*, Presl, in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 178, pl. lxviii. fig. 6.
 1875. *Sagenaria obovata*, Feistmantel (*pars*), *Vers. d. böhm. Ablag.*, Abth. ii. p. 30, pl. ix. figs. 1 and 3 (non figs. 2 and 4).
 1838. *Sagenaria rugosa*, Presl, in Sternb., *Essai flore monde prim.*, vol. ii. fasc. 7-8, pl. lxviii. fig. 4.
 1848. *Lepidodendron Rhodianum*, Sauveur (non Sternb.), *Végét. foss. terr. houil. Belgique*, pl. lxiii. fig. 1.
 1850-57. *Lepidodendron clypeatum*, Lesqx., *Boston Journ. Nat. Hist.*, vol. iv. No. 4, p. 429.
 1858. *Lepidodendron clypeatum*, Lesqx., in Rogers, *Geol. of Pennsylv.*, p. 875, pl. xv. fig. 5, pl. xvi. fig. 7.
 1879. *Lepidodendron clypeatum*, Lesqx., *Coal Flora*, vol. ii. p. 380, pl. lxiv. fig. 16, 16a (non figs. 16b, 17, 18).
 1860. *Lepidodendron venustum*, Wood, *Proc. Amer. Acad. Nat. Sc. Philad.*, p. 239, pl. v. fig. 2.
 1869. *Lepidodendron venustum*, Wood, *Trans. Amer. Phil. Soc.*, vol. xiii. p. 346, pl. ix. fig. 1.
 1860. *Lepidophloios irregularis*, Lesqx., *Second Rept. of a Geol. Reconnaissance of the Middle and Southern Counties of Arkansas*, p. 311, pl. iv. fig. 3.
 1869. *Lepidodendron Sternbergii*, Roehl (non Brongt.), *Foss. Flora d. Steink.-Form. Westph.*, p. 127, pl. viii. fig. 8a.
 1875. *Sagenaria aculeata*, Feist. (non Sternb.) (*pars*), *Vers. d. böhm. Ablag.*, Abth. ii. p. 34, pl. xi. figs. 3-4.
 1880. *Lepidodendron dichotomum*, Lesqx. (non Sternb.), *Coal Flora*, vol. ii. p. 384, pl. lxiv. fig. 3.
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Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Remarks.—From the examination of a small series of *Lepidodendron clypeatum* Lesqx., received from the late Mr R. D. LACOE, I have satisfied myself that this species does not differ in any character from *Lepidodendron obovatum*, Sternb.

Lepidostrobus, Brongniart.

Lepidostrobus, sp.

Locality.—Engine Pit, Rowanburn.

Horizon.—Shale associated with *Five-foot Coal*.

Stigmaria, Brongniart.

Stigmaria ficoides, Sternberg, sp.

Stigmaria ficoides, Sternb., sp. See *ante*, p. 757.

Locality.—Engine Pit, Rowanburn.

Horizons.—Shale associated with *Five-foot Coal* and *floor of Seven-foot Seam*.

Cordaiteæ.

Cordaianthus, Grand' Eury.

Cordaianthus Pitcairniæ, L. and H., sp.

1833. *Antholithus Pitcairniæ*, L. and H., *Fossil Flora*, vol. ii., pl. lxxxii.
 1877. *Botryoconus Pitcairniæ*, Grand' Eury, *Flore Carbon. d. Départ. de la Loire*, p. 280.
 1881. *Cordaianthus Pitcairniæ*, Renault, *Cours d. botan. foss.*, vol. i. p. 94, pl. xiii. fig. 7.
 1886. *Cordaianthus Pitcairniæ*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 639, pl. xciv. figs 4-5.
 1900. *Samaropsis Pitcairniæ*, Zeiller, *Éléments d. Paléobot.*, p. 211, fig. 144.
 1833. *Cardiocarpum acutum*, L. and H., *Fossil Flora*, vol. i., pl. lxxvi.
 1872. *Cardiocarpon Lindleyi*, Carr., *Geol. Mag.*, vol. ix. p. 55, figs. 1-2.
 1872. *Cardiocarpon Lindleyi*, Balfour, *Palæont. Bot.*, p. 65, figs. 51-52.
 1879. *Cardiocarpon Lindleyi*, Roemer, *Lethæa Geog.*, vol. i. p. 247, fig. 36.
 1874. *Antholithus Lindleyi*, Schimper, *Traité d. paléont. végét.*, vol. iii. p. 566, pl. ex. figs. 10-11.
 1881. *Cordaianthus Lindleyi*, Renault, *Cours d. botan. foss.*, vol. i. p. 95, pl. xiii. fig. 9.

Locality.—Blinkbonny Pit, Rowanburn.

Horizon.—Roof of *Main Coal*.

The following Table shows the vertical distribution in Britain of the Lower Coal Measure plants from Rowanburn, Canonbie.

	U. C. M.	M. C. M.	L. C. M.
<i>Sphenopteris obtusiloba</i> , Brongt.,		x	x
(?) „ <i>Schützei</i> , Stur, sp.,		?	x
<i>Eremopteris artemisiæfolia</i> , Sternb., sp.,		x	x
<i>Mariopteris muricata</i> , Schl., sp.,	x	x	x
<i>Alethopteris louchitira</i> , Schl., sp.,	x	x	x
<i>Neuropteris heterophylla</i> , Brongt.,		x	x
„ <i>gigantea</i> , Sternb.,		x	x
„ <i>Blissii</i> , Lesqx.,			x
„ <i>obliqua</i> , Brongt., sp.,		x	x
<i>Calamites</i> (<i>Calamitina</i>) <i>undulatus</i> , Sternb.,	x	x	x
„ (<i>Stylocalamites</i>), <i>Cistii</i> , Brongt.,	x	x	x
<i>Calamites</i> , sp.,	x	x	x
<i>Sphenophyllum cuneifolium</i> , Sternb., sp.,		x	x
<i>Lepidodendron aculeatum</i> , Sternb.,	x	x	x
„ <i>obovatum</i> , Sternb.,		x	x
<i>Lepidostrobus</i> , sp.,	x	x	x
<i>Stigmaria ficioides</i> , Sternb., sp.,	x	x	x
<i>Corlaicaulus Pitcairniæ</i> , L. and H., sp.,		x	x

Of the sixteen species under consideration, all occur in the Lower Coal Measures of Britain, fourteen occur in the Middle Coal Measures of Britain, excluding one of whose occurrence in that horizon there is some doubt, and six are common to all divisions of the Coal Measures. In all cases the majority of the Lower Coal Measure species are found in the Middle Coal Measures, but the Middle Coal Measures are distinguished from the Lower Coal Measures by the presence of species peculiar to that division, and these are entirely absent from the Rowanburn Coals, which contain a most typical Lower Coal Measure flora.

From the Upper Coal Measures the Rowanburn Coals are easily distinguished by the entire absence of all characteristic Upper Coal Measure species.

The fossil plants from Rowanburn leave, therefore, no doubt as to the series belonging to the Lower Coal Measures.

FOSSIL PLANTS OF THE MIDDLE COAL MEASURES.

In the Middle Coal Measures several localities were found by Mr A. MACCONOCHIE which yielded fossil plants, and one bed which passes across the mouth of the Byre Burn a few yards above Byreburn Bridge, and which is again found on the River Esk about 30 yards below the junction of the Byre Burn with that river, was particularly rich in species.

The following are the localities in the Middle Coal Measures, Canonbie, from which fossil plants were collected, arranged in ascending series,—locality A being the lowest bed, and locality F being the highest, in which fossil plants were observed.

Locality A.—Byre Burn, underneath railway viaduct near Gilnockie railway station. In clayey sandy shale.

Locality B.—Byre Burn, about 300 yards above junction with river Esk. In soft grey shale.

Locality C.—Bed in stream a few yards above bridge at foot of Byre Burn.

Horizon.—Dark shale band lying between the *Three-quarter Coal* and *Main Coal of Byreburn*.

Locality D.—River Esk, left bank, about 30 yards below junction of Byre Burn, and a short distance above old engine-house.

Horizon.—Dark shale with ironstone band, lying between *Three-quarter Coal* and *Main Coal of Byreburn*. Localities C and D are different portions of the same band.

Locality E.—River Esk, right bank, below junction of Byre Burn, almost opposite Byreburn cottages. In soft shale.

Locality F.—River Esk, left bank, about 240 yards below junction of Byre Burn. In soft red-stained shale.

Filicaceæ.

Sphenopteris, Brongniart.

Sphenopteris obtusiloba, Brongt.

Sphenopteris obtusiloba, Brongt., *ante*, p. 768.

Locality A.

Sphenopteris Laurentii, Andræ.

1869. *Sphenopteris Laurentii*, Andræ, *Vorwelt Pflanzen.*, p. 39, pl. xiii. figs. 1–3.

1886. *Sphenopteris Laurentii*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 85, pl. vi. fig. 3, pl. ix. fig. 4.

1899. *Sphenopteris (Renaultia) Laurenti*, Zeiller, *Flore foss. d. bassin houil. d'Héraclée*, p. 16, pl. i. fig. 16.

1883. *Hapalopteris Laurentii*, Stur, *Morph. und Syst. d. Culm u. Carbon Farne*, p. 32.

1885. *Hapalopteris Laurentii*, Stur, *Carbon-Flora d. Schatz. Schichten*, vol. i. p. 36, pl. xlv. figs. 5–6.

1869. *Sphenopteris stipulata*, Andræ (*non* Gutbier), *Vorwelt Pflanzen.*, p. 40, pl. xiii. fig. 4.

Locality D.

Sphenopteris mixta, Schimper.

1869. *Sphenopteris mixta*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 382.

1870. *Sphenopteris mixta*, Lesqx., *Geol. Survey of Illin.*, vol. iv. p. 409, pl. xv. figs. 7–8.

1879. *Sphenopteris mixta*, Lesqx. (*pars*), *Coal Flora*, vol. i. p. 276 (*non* pl. liv. figs. 1–3).

1886. *Sphenopteris mixta*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 95, pl. xii. fig. 3.

1889. *Sphenopteris mixta*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxv. p. 405.

1899. *Sphenopteris mixta*, White, *Foss. Flora Lower Coal Meas. Missouri*, p. 35, pl. xi. fig. 3, pl. xii. figs. 1-2, pl. xiii. figs. 4-5.
 1893. *Ovopteris mixta*, Potonié, *Flora d. Rothl. von Thüringen*, p. 44.
 1866. *Sphenopteris rigida*, (?) Lesqx. (non Brongt.), *Geol. Survey Illin.*, vol. ii. p. 435, pl. xxxix. figs. 5-6.
 1872. *Sphenopteris (Aneimioides) pulchra*, Marrat, in *Higgins, Proc. Liverpool Geol. Soc.*, session 13, 1871-72, p. 101, pl. viii. fig. 1.
 1884. *Pseudoplectopteris nummularia*, Lesqx. (non Gutbier), *Coal Flora*, vol. iii. p. 751, pl. ciii. figs. 1-3.

Locality C.

Sphenopteris Hæninghausi, Brongt.

1828. *Sphenopteris Hæninghausi*, Brongt., *Prodrome*, p. 51.
 1829. *Sphenopteris Hæninghausi*, Brongt., *Hist. d. végét. foss.*, vol. i. p. 199, pl. lii.
 1848. *Sphenopteris Hæninghausi*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xxii. fig. 2.
 1865. *Sphenopteris Hæninghausi*, André, *Vorwelt Pflanzen.*, p. 13, pls. iv-v.
 1869. *Sphenopteris Hæninghausi*, Roehl, *Foss. Flora d. Stein.-Form. Westph.*, p. 54, pl. xiv. fig. 8 (? pl. xiii. fig. 3).
 1869. *Sphenopteris Hæninghausi*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 385, pl. xxix.
 1880. *Sphenopteris Hæninghausi*, Zeiller, *Végét. foss. d. terr. houil.*, p. 41, pl. clxii. figs. 4-5.
 1880. *Sphenopteris Hæninghausi*, Lesqx., *Coal Flora*, vol. i. p. 288, pl. lv. fig. 5.
 1880. *Sphenopteris Hæninghausi*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 26, pl. vi. fig. 1; *Ergänzungsblatt*, i. fig. 39.
 1882. *Sphenopteris Hæninghausi*, Weiss, *Aus d. Steink.*, p. 13, pl. xi. figs. 68-69 (zweiter abdr.).
 1883. *Sphenopteris Hæninghausi*, Renault, *Cours d. botan. foss.*, vol. ii. p. 191, pl. xxxii. figs. 1-3.
 1891. *Sphenopteris Hæninghausi*, Kidston, *Trans. Geol. Soc. Glas.*, vol. ix. p. 48, pl. iv. fig. 44.
 1899. *Sphenopteris Hæninghausi*, Hofmann and Ryba, *Leitpflanzen*, p. 41, pl. iv. figs. 7, 7a, 7b.
 1901. *Sphenopteris Hæninghausi*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. p. 213, pl. xxix. fig. 5.
 1886. *Sphenopteris (Calymmatotheca) Hæninghausi*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 82, pl. v. fig. 3, pl. vi. figs. 1-2.
 1899. *Sphenopteris (Calymmatotheca ?) Hæninghausi*, Zeiller, *Étude flore foss. bassin houil. d'Héracleé*, p. 10.
 1836. *Cheilanthes Hæninghausi*, Göpp., *Syst. fil. foss.*, p. 244.
 1877. *Calymmatotheca Hæninghausi*, Stur, *Culm Flora*, vol. ii. p. 266.
 1883. *Calymmatotheca Hæninghausi*, Stur, *Morph. u. Syst. d. Culm u. Carbonfarne*, p. 174.
 1885. *Calymmatotheca Hæninghausi*, Stur, *Carbon-Flora d. Schatz. Schicht.*, vol. i. p. 258, pl. xxx., pl. xxxi. figs. 1, 2, 3.
 1888. *Calymmatotheca (Sphenopteris) Hæninghausi*, Toula, *Die Steinkohlen*, p. 188, pl. i. fig. 14.
 1826. *Sphenopteris asplenoides*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xvi; vol. ii. fasc. 5-6, p. 62.
 1869. *Sphenopteris distans*, Roehl (non Sternb.), *Foss. Flora d. Steink.-Form. Westph.*, p. 54, pl. xv. fig. 9.
 1869. ? *Sphenopteris elegans*, Roehl (non Brongt. ?), *Foss. Flora d. Steink.-Form. Westph.*, p. 52, pl. xv. fig. 8, pl. xxvi. fig. 5.

Remarks.—I believe the figures of *Sphenopteris distans* and *Sphenopteris elegans* given by ROEHL* belong to *Sphenopteris Hæninghausi*, Brongt., as already pointed out by STUR.† The figures are, however, not good.

* *Foss. Flora d. Steink.-Form. Westph.*, l.c., in synonymy.

† *Carbon-Flora d. Schatz. Schicht.*, vol. i., *Die Farne*, p. 259.

FEISTMANTEL also gives a figure of *Sphenopteris Hæninghausi* which is probably referable to this species, but if so, the figure is not quite satisfactory.* The same remark may be made regarding the figure given by GEINITZ.† His enlargement is a somewhat inaccurate copy of BRONGNIART'S, pl. lii. fig. a.

The *Sphenopteris Hæninghausi*, Feistmantel,‡ is probably referable to the *Sphenopteris bermudensisformis*, Schl., sp. (= *Sphenopteris distans*, Sternb.).

POTONIÉ|| has proposed the union of *Calymmotheca Stangeri*, Stur, *Calymmotheca Larischi*, Stur, *Calymmotheca Schlehani*, Stur, and *Calymmotheca Rothschildi*, Stur, § with *Sphenopteris Hæninghausi*, treating them as varieties of BRONGNIART'S species. This view I am unable to accept, as STUR'S species appear to me to be essentially distinct from BRONGNIART'S *Sphenopteris Hæninghausi*.

The fern figured under the name of *Sphenopteris Hæninghausi* by LINDLEY and HUTTON ¶ is specifically distinct from BRONGNIART'S plant, and for it I have proposed the name of *Sphenopteris effusa*.** The specimen figured by LINDLEY and HUTTON is preserved in the Hutton Collection in the museum, Newcastle-on-Tyne.

The specimens on which *Sphenopteris Hæninghausi*, Brongt., is here recorded were received from the late Mr HUGH MILLER, F.R.S.E., some years after the publication of my earlier "Report on the Fossil Plants collected by the Geological Survey of Scotland in Eskdale and Liddesdale." †† They bear the date of April 1869, and are merely localised "Byre Burn."

Locality.—Byre Burn.

Sphenopteris multifida, L. and H.

1834. *Sphenopteris multifida*, L. and H., *Fossil Flora*, vol. ii. p. 113, pl. cxxiii.

Locality A.

Pecopteris, Brongniart.

Pecopteris, sp.

Locality D.

Mariopteris, Zeiller.

Mariopteris muricata, Schlotheim, sp.

Mariopteris muricata, Schl., sp. See *ante*, p. 771.

Locality A.

* *Vers. d. böhm. Ablager.*, Abth. iii. p. 57, pl. xvi. fig. 2, 1876.

† *Vers. d. Steinkf. in Sachsen*, pl. xxiii. figs. 5-6.

‡ *Zeitsch. d. deut. geol. Gesell.*, vol. xxv. pl. xiv. fig. 7.

§ All described in *Culm Flora*, vol. ii. 1877.

|| *Ueber einige Carbonfarne*, ii. Theil, *Jahrb. d. König. preuss. geol. Landesanstalt für 1890*, p. 16, pls. vii.-ix., 1891.

¶ *Fossil Flora*, vol. iii. pl. cciv.

** *Catal. Paleoz. Plants*, p. 71, 1886.

†† *Trans. Roy. Soc. Edin.*, vol. xxx. p. 531, 1883.

Alethopteris, Sternberg.

Alethopteris lonchitica, Schlotheim, sp.

Alethopteris lonchitica, Schl., sp. See *ante*, p. 772.

Localities A, C, E.

Alethopteris Davreuxi, Brongt., sp.

1828. *Pecopteris Davreuxi*, Brongt., *Prodrome*, p. 57 (*excl. ref.*).
 1832 or 1833. *Pecopteris Davreuxi*, Brongt., *Hist. d. végét. foss.*, p. 279, pl. lxxxviii. figs. 1-2.
 1848. *Pecopteris Davreuxi*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xlii. figs. 2-3.
 1836. *Alethopteris Davreuxi*, Göpp., *Syst. fil. foss.*, p. 295.
 1886. *Alethopteris Davreuxi*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 228, pl. xxxii. fig. 1.
 1888. *Alethopteris Davreuxi*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 386, pl. xxiv. fig. 1.
 1893. *Alethopteris Davreuxi*, Potonié, *Flora d. Rothl. v. Thüringen*, p. 102 (? pl. x. figs. 2-3).
 1832 or 1833. *Pecopteris Dournaisii*, Brongt., *Hist. d. végét. foss.*, p. 282, pl. lxxxix. fig. 1 (? *non* fig. 2).
 1836. *Alethopteris Dournaisii*, Göpp., *Syst. fil. foss.*, p. 298.
 1848. *Pecopteris Hoffmanni*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xxxvii. fig. 1.
 1848. *Pecopteris rugosa*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xxxvii. fig. 2.
 1883. *Alethopteris Rungi*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 135, pl. xli. fig. 10.
 1883. *Alethopteris interrupta*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 136, pl. xli. fig. 13.

Localities C, D.

Alethopteris Grandini, Brongt., sp.

- 1832 or 1833. *Pecopteris Grandini*, Brongt., *Hist. d. végét. foss.*, p. 286, pl. xci. figs. 1-4.
 1876. *Pecopteris Grandini*, Heer, *Flora foss. Helv.*, p. 33, pl. xii. fig. 10a.
 1836. *Alethopteris Grandini*, Göpp., *Syst. fil. foss.*, p. 299.
 1883. *Alethopteris Grandini*, Renault, *Cours d. botan. foss.*, vol. iii. p. 157, pl. xxvii. figs. 3-4.
 1886. *Alethopteris Grandini*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 237, pl. xxxviii. figs. 1-2.
 1888. *Alethopteris Grandini*, Zeiller, *Flore foss. terr. houil. d. Commeny*, prem. partie, p. 203, pl. xxi. figs. 1-8.
 1890. *Alethopteris Grandini*, Zeiller, *Flore foss. bassin houil. et perm. d'Autun et d'Épinac*, prem. partie, p. 114, pl. ix. figs. 6-7.
 1899. *Alethopteris Grandini*, Hofmann and Ryba, *Leitpflanzen*, p. 56, pl. viii. figs. 4, 4a, 5, 5a.

Localities C, D.

Neuropteris, Brongniart.

Neuropteris heterophylla, Brongt.

Neuropteris heterophylla, Brongt. See *ante*, p. 773.

Locality E.

Neuropteris gigantea, Sternb.*Neuropteris gigantea*, Sternb. See *ante*, p. 775.*Localities* B, F.

Equisetaceæ.

Calamites, Suckow.Group I.—*Calamitina*, Weiss.*Calamites (Calamitina) undulatus*, Sternb.*Calamites (Calamitina) undulatus*, Sternb. See *ante*, p. 776.*Locality* D.*Calamites (Calamitina) Schützei*, Stur.

1881. *Calamites Schützei*, Stur, *Zur Morph. d. Calamarien*, p. 8 (*Sitzb. d. k. Akad. d. Wissensch.*, vol. lxxxiii., i. Abth., 1881, p. 416), pl. i. fig. 1.
1887. *Calamites Schützei*, Stur, *Calamarien d. Carbon-Flora d. Schatz. Schicht. (K. k. geol. Reichs. Abhandl.*, vol. xi. Abth. ii., Wien), p. 131, pl. iii. figs. 2, 2b, pl. iv., pl. iv.b fig. 1, pl. xvii. fig. 2, text figs. 33–38.
1888. *Calamites Schützei*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 350, pl. lv. fig. 4.
1884. *Calamites (Calamitina) varians*, cf. *Schützei*, Weiss, *Steinkohl. Calamarien*, part ii. p. 79, pl. xxi. fig. 5, p. 80, pl. xxvii. fig. 2.
1825. (?) *Calamites approximatus*, Artis (*non* Schloth.), *Antedil. Phyt.*, pl. iv.
1828. (?) *Calamites approximatus*, Brongt. (*pars*) (*non* Schloth.), *Hist. d. végét. foss.*, p. 133, pl. xv. figs. 7–8, pl. xxiv. fig. 1.
1833. (?) *Calamites approximatus*, L. and H., *Fossil Flora*, vol. i., pl. lxxvii.
1887. (?) *Calamites approximatus* Stur, (*pars*), *Calamarien d. Carbon.-Flora d. Schatz. Schicht.*, p. 119, pl. viii. figs. 2–3, pl. xii. fig. 7.

Remarks.—ZEILLER has clearly pointed out that the *Calamite* figured by several writers under the name of *Calamites approximatus* cannot be SCHLOTHEIM's plant which was described as being somewhat similar to his *Calamites cannæformis*, but with longer joints and narrower ribs.* What *Calamites cannæformis* really is is equally uncertain, but it is clear that the short jointed *Calamite* pith cast, which has so often been figured as *Calamites approximatus*, cannot be the described but unfigured plant to which SCHLOTHEIM applied the name. ZEILLER thinks that the true *Calamites approximatus*, Schloth., may be identical with BRONGNIART's *Calamites Cistii*, but this cannot be satisfactorily determined.

There seems, therefore, no other course open than to let the name of *Calamites approximatus*, Schlotheim (*non* Artis and Brongt.), disappear from our lists, and slip into oblivion.

The question next arises,—To which species are the various specimens which have

* ZEILLER, *Flore foss. bassin houil. d. Valen.*, p. 352.

been figured and described as *Calamites approximatus* to be referred? Several of these seem to be referable to STUR's *Calamites Schützei*, such as those figured in part by BRONGNIART, by ARTIS, by LINDLEY and HUTTON, and in part by STUR.

The other forms with very short joints, such as those figured by BRONGNIART,* GEINITZ,† WEISS,‡ ARBER,§ and myself,|| offer considerable difficulty in referring them to any of the recognised species. STUR has proposed the name of *Calamites Waldenburgensis* for these, but includes under this name some which appear to belong to his *Calamites Schützei*.¶

These short jointed *Calamites* possibly do not represent a true species, but may be only a condition of growth of *Calamites varians*, Sternb.,** or of *Calamites Schützei*, Stur. In fact, *Calamites Schützei* appears to be very closely related to *Calamites varians*, Sternb., and may be only a form or variety of that species, and this view was that which I previously held; nor am I yet quite certain that this is not the correct opinion, for in many cases it is difficult to determine whether some specimens should be referred to *Calamites Schützei* or to *Calamites varians*, Sternb. Many of the specimens I have previously recorded as *Calamites varians* would, according to the present view of most botanists, be referred to *Calamites Schützei*, Stur.

For the short jointed forms, to which I have already referred, until their true position is determined, I would propose that STUR's *Calamites Waldenburgensis* be provisionally employed for their reception.

Locality D.

Calamites (Calamitina) pauciramis, Weiss.

(Plate IV. fig. 36; Plate V. fig. 44.)

1884. *Calamites (Calamitina) pauciramis*, Weiss, *Steinkohlen Calamarien*, part ii. p. 93, pl. xi. fig. 1.

This species is closely related to *Calamites (Calamitina) discifer*, Weiss,†† and may be specifically identical, the chief difference being that *C. discifer*, Weiss, has three scars on each branch-bearing node, whereas *C. pauciramis*, Weiss, has only two. The bark of *C. discifer* is smooth, while that of *C. pauciramis*, Weiss, is said to be ribbed. According to WEISS, the branch scars are borne on every third node.

I have only seen two fragments of *C. pauciramis*, which are given on Plate IV. fig. 36 and Plate V. fig. 44, natural size.

That shown on Plate IV. fig. 36 is the more perfect, but is not sufficiently complete to show two branch-bearing nodes, only three internodes being seen, of which the lowest node bears the branch scar. On this specimen the smooth bark is covered with short

* *Hist. d. végét. foss.*, pl. xxiv. figs. 2-5.

† *Vers. d. Steink. in Sachsen*, pl. xii. fig. 3.

‡ *Steinkohl. Calamarien*, part 2, pl. xxv. fig. 1.

§ *Quart. Journ. Geol. Soc.*, vol. lix., pl. i. fig. 3.

|| *Trans. Roy. Soc. Edin.*, vol. xxxvii., pl. ii. figs. 5-6. *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv., pl. xxxv. fig. 2.

¶ STUR, *Calamarien d. Carbon-Flora d. Schatz. Schichten*, p. 119.

** *Essai flore monde prim.*, vol. ii. p. 50, pl. xii.

†† WEISS, *Steinkohlen Calamarien*, part ii. p. 91, pl. vii. fig. 3.

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fine close lines, and shows the true outer surface of the stem, as proved by the cetaceous single nerved leaves being still attached to the uppermost and second nodes. The ribbed stem of the example figured by WEISS I am inclined to ascribe to its condition of preservation.

The specimen given on Plate V. fig. 44 is not quite so well preserved, but shows faint indications of the ribbing described by WEISS. The straight parallel lines seen passing over the scar and other parts of the surface of this specimen must not, however, be mistaken for ribbing, as they have been imparted to the stem by longitudinal cracks in the coaly matter which once adhered to it.

STUR* has united *C. discifer*, Weiss, *C. pauciramis*, Weiss, and *C. macrodiscus*, Weiss, to *C. Germanianus*, Göpp.,† but I do not think we are at present justified in uniting all these species under one name.

Calamites (Calamitina), sp.

Locality D.

Group II.—Eucalamites, Weiss.

Calamites (Eucalamites) ramosus, Artis.

- 1825. *Calamites ramosus*, Artis, *Antedil. Phyt.*, pl. ii.
- 1828. *Calamites ramosus*, Brongt., *Hist. d. végét. foss.*, p. 127, pl. xvii. figs. 5–6.
- 1848. *Calamites ramosus*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. ix. figs. 2–3.
- 1882. *Calamites ramosus*, Weiss, *Aus d. Steinkohl.*, p. 10, pl. viii. fig. 44 (zweiter abdr.).
- 1886. *Calamites ramosus*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 345, pl. lv. fig. 3, pl. lvi. fig. 3.
- 1886. *Calamites ramosus*, Kidston, *Trans. Geol. Soc. Glas.*, vol. viii. p. 51, pl. iii. fig. 1.
- 1887. *Calamites ramosus*, Stur (pars), *Calamarien d. Carbon-Flora d. Schatz. Schicht.*, p. 96, pl. xii. figs. 1–4 (non 5–6), pl. xii. b figs. 1–4 (? 5), 6, pl. xiii. figs. 1–9, pl. xiv. figs. 3–5, text figs. 1 (p. 4), 31 (p. 104), 32 (p. 105), (non fig. 2, p. 8).
- 1888. *Calamites ramosus*, Toula, *Die Steinkohlen*, p. 205, pl. v. fig. 24.
- 1891. *Calamites ramosus*, Kidston, *Proc. Roy. Phys. Soc. Edin.*, vol. x. p. 354.
- 1901. *Calamites ramosus*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. pp. 201, 229, pl. xxxvii. figs. 3–4.
- 1884. *Calamites (Eucalamites) ramosus*, Weiss, *Steinkohl. Calamarien*, part ii. p. 98, pl. ii. fig. 3, pl. v figs. 1–2, pl. vi. pl. vii. figs. 1–2, pl. viii. figs. 1, 2, 4, pl. ix. figs. 1–2, pl. x. fig. 1, pl. xx. figs. 1–2 (includes *Annularia ramosa* and *Calamostachys ramosa*).
- 1899. *Calamites (Eucalamites) ramosus*, Hofmann and Ryba, *Leitpflanzen*, p. 25, pl. i. fig. 8.
- 1824. *Calamites nodosus*, Sternb. (non Schloth.), *Essai flore monde prim.*, vol. i. fasc. 2, pp. 30 and 36, pl. xvii. fig. 2; fasc. 4, p. xxvii; fasc. 5–6, p. 48.
- 1831. *Calamites nodosus*, L. and H. (pars) (non Schloth.), *Fossil Flora*, vol. i. pl. xv. (not branch to right or fig. 2) (non pl. xvi.).
- 1877. *Calamites nodosus*, Lebour (non Schloth.), *Illustr. of Fossil Plants*, pp. 3, 7, pls. ii.–iii.
- 1833. *Calamites carinatus*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 3, pp. 40 and 44, pl. xxxii. fig. 1; fasc. 4, p. xxvii.
- 1854. *Calamites communis*, Ett. (pars), *Steinkf. v. Radnitz*, p. 24, pl. iii. fig. 2, pl. iv. fig. 4.

* STUR, *Die Calam. d. Carbon-Flora. d. Schatz. Schichten*, p. 174.

† GÖPPERT, *Foss. Flora d. Übergangs*, p. 122, pl. xlii. fig. 1.

Foliage :—

1822. *Asterophyllites radiatus*, Brongt., *Class. d. végét. foss.*, p. 35, pl. ii. figs. 7a, 7b.
 1828. *Annularia radiata*, Brongt., *Prodrome*, p. 156.
 1848. *Annularia radiata*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxvii. fig. 2.
 1869. *Annularia radiata*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 28, pl. iv. fig. 3 (fig. 4 ?).
 1874. *Annularia radiata*, Feistmantel, *Vers. d. böhm. Ablager.*, p. 130, pl. xvii. figs. 2-4.
 1877. *Annularia radiata*, Breton, *Étude stratig. d. terr. houil. d'Auchy-au-Bois*, pl. viii. (pars).
 1880. *Annularia radiata*, Zeiller, *Végét. foss. du terr. houil.*, p. 24, pl. clx. fig. 1.
 1882. *Annularia radiata*, Renault, *Cours. d. botan. foss.*, vol. ii. p. 133, pl. xx. fig. 4.
 1886. *Annularia radiata*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 394, pl. lix. fig. 8, pl. lxi. figs. 1-2.
 1899. *Annularia radiata*, Zeiller, *Flore foss. d. bassin houil. d'Héraclée*, p. 64, pl. v. fig. 15.
 1899. *Annularia radiata*, Hofmann and Ryba, *Leitpflanzen*, p. 28, pl. ii. fig. 10.
 1899. *Annularia radiata*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 221, fig. 197.
 1899. *Annularia radiata*, Frech, *Leth. geog.*, Band 2, Lief. 2, *Steinkohlenform.*, pl. 1a fig. 1.
 1901. *Annularia radiata*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. pp. 201, 229, pl. xxxvii. fig. 2.
 1832. *Asterophyllites foliosa*, L. and H., *Fossil Flora*, vol. i., pl. xxv.
 1855. *Asterophyllites foliosa*, Geinitz (pars), *Vers. d. Steinkf. in Sachsen*, p. 10, pl. xvi. fig. 3 (? 2) (non figs. 1 and 4).
 1874. ? *Asterophyllites foliosa*, Feistmantel, *Vers. d. böhm. Ablager.*, p. 121, pl. xiv. figs. 2, 3, 4.
 1848. *Annularia asterophyllioides*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxvii. fig. 1.
 1848. *Annularia patens*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. lxix. fig. 4.
 1886. *Annularia patens*, Kidston, *Trans. Geol. Soc. Glasgow*, vol. viii. p. 53, pl. iii. fig. 2.
 1851. *Annularia minuta*, Ett., *Haidinger's Naturwiss. Abhandl.*, vol. iv. Abth. i. p. 83, pl. x. figs. 1-2.
 1890. ? *Annularia stellata*, Renault (? non Schlotheim), *Flore foss. terr. houil. d. Commeny*, part. ii., explan. to plates, p. 2, pl. xlvii. figs. 1-2.

Locality D (stems and foliage branches).

Group III.—Stylocalamites, Weiss.

Calamites (Stylocalamites) Suckowii, Brongt.

1784. *Calamites*, Suckow, *Acad. Elect. Theodoro-Palatinae*, vol. v. p. 355, pl. xvi. fig. 2, pl. xix. figs. 8-9.
 1828. *Calamites Suckowii*, Brongt., *Hist. d. végét. foss.*, p. 124 (pl. xiv. fig. 6 ?), pl. xv. figs. 1-6, pl. xvi. (fig. 1 ?) figs. 2, 3, 4.
 1833. *Calamites Suckowii*, Sternb., *Essai flore monde prim.*, vol. ii. fasc. 5-6, p. 49.
 1835. *Calamites Suckowii*, Gutbier, *Abdr. u. Vers. d. Zwick. Schwarzkohl.*, p. 17, pl. ii. fig. 1 (non fig. 2).
 1848. *Calamites Suckowii*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. iii., pl. iv. figs. 1-2, pl. xi. fig. 3.
 1851. *Calamites Suckowii*, Bronn, *Lethæa geog.*, vol. i. p. 101, pl. vi. figs. 1a, 1b.
 1855. *Calamites Suckowii*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 6, pl. xiii. figs. 1, 3, 5, 6 (? 4).
 1868. *Calamites Suckowii*, Dawson, *Acad. Geol.*, 2nd ed., p. 195, fig. 39, p. 442, fig. 163 A², A⁴, p. 478.
 1869. *Calamites Suckowii*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 9, pl. i. fig. 6, pl. ii. fig. 2.
 1871. *Calamites Suckowii*, Weiss, *Foss. Flora d. jüngst. Stk. u. Rothl.*, p. 117, pl. xiii. fig. 5.
 1874. *Calamites Suckowii*, Feistmantel (pars), *Vers. d. böhm. Ablager.*, Abth. i. p. 102, pl. ii. figs. 3-4, pl. iii. figs. 1-2, pl. iv. figs. 1-2, pl. v., pl. vi. fig. 1.

1876. *Calamites Suckowii*, Weiss, *Steinkohlen Calamarien*, part i. p. 123, pl. xix. fig. 1; part ii., 1884, p. 129, pl. ii. fig. 1, pl. iii. figs. 2, 3, pl. iv. fig. 1, pl. xxvii. fig. 3.
1879. *Calamites Suckowii*, Roemer, *Lethæa geog.*, vol. i. p. 144, pl. l. fig. 1.
1877. *Calamites Suckowii*, Grand' Eury, *Flore Carbon. du Départ. de la Loire*, p. 14, pl. i. figs. 1-6.
1880. *Calamites Suckowii*, Zeiller, *Végét. foss. d. terr. houil.*, p. 12, pl. clix. fig. 1.
1882. *Calamites Suckowii*, Weiss, *Aus d. Steink.*, p. 10, pl. vii. fig. 43 (zweiter abdr.).
1882. *Calamites Suckowii*, Renault, *Cours d. botan. foss.*, vol. ii. p. 159, pl. xxiv. figs. 3-5.
1886. *Calamites Suckowii*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 333, pl. liv. figs. 2-3, pl. lv. fig. 1.
1887. *Calamites Suckowii*, Stur (pars), *Calamarien d. Carbon-Flora d. Schatz. Schicht.*, p. 145, pl. iii. figs. 3-4, pl. v. figs. 5-6, pl. xvi. figs. 1-2 (non pl. i. fig. 3, pl. ix. fig. 2, pl. xiv. fig. 1).
1888. *Calamites Suckowii*, Toulou, *Die Steinkohlen*, p. 202, pl. v. figs. 1, 2, 9 (non fig. 26).
1890. *Calamites Suckowii*, Renault, *Flore foss. terr. houil. d. Commeny*, p. 385, pl. xliii. figs. 1-3, pl. xlv. figs. 4-5.
1899. *Calamites Suckowii*, Hofmann and Ryba, *Leitpflanzen*, p. 24, pl. i. fig. 6.
1900. *Calamites Suckowii*, Zeiller, *Éléments de paléobot.*, p. 149, fig. 149.
1900. *Calamites Suckowii*, Scott, *Studies in Fossil Botany*, p. 15, fig. 2, p. 16, fig. 3.
1901. *Calamites Suckowii*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. pp. 200, 202, 215, 225, pl. xxx. fig. 1, pl. xxxv. fig. 3.
1833. *Calamites cannaformis*, L. and H. (non Schlotheim), *Fossil Flora*, vol. i., pl. lxxix.
1833. *Calamites æqualis*, Sternb., *Essai flore monde prim.*, vol. ii. fasc. 5-6, p. 49.
1848. *Calamites Artisii*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. vii. figs. 1-2.
1848. *Calamites nodosus*, Sauveur (non Schlotheim), *Végét. foss. terr. houil. Belgique*, pl. xii. fig. 3.
1874. *Calamites approximatus*, Feistmantel (non Schlotheim), *Vers. d. böhm. Ablager.*, Abth. i. p. 106, pl. vi. fig. 2, pl. vii. figs. 1-2.
1877. *Calamites cannaformis*, Lebour (non Schlotheim), *Illustr. of Fossil Plants*, pl. i.
1882. *Calamites irregularis*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 89, pl. xxviii. fig. 2.
1898. *Calamites*, Seward, *Fossil Plants*, p. 323, fig. 82.
1825. (?) *Calamites decoratus*, Artis, *Antedil. Phyt.*, pl. xxiv.
1828. (?) *Calamites decoratus*, Brongt. (pars), *Hist. d. végét. foss.*, p. 123, pl. xiv. figs. 1-2 (non figs. 3-4).

Locality D.

Calamites (Stylocalamites) *Cistii*, Brongniart.

Calamites (Stylocalamites) *Cistii*, Brongt. See ante, p. 777.

Locality D.

Calamocladus, Schimper.

Calamocladus equisetiformis, Schlotheim, sp.

1709. Scheuchzer, *Herb. diluv.*, pl. i. fig. 5, pl. ii. fig. 1.
1793. Ure, *Rutherglen and East Kilbride*, pl. xii. fig. 4.
1804. Schlotheim, *Flora d. Vorwelt*, p. 30, pl. i. figs. 1-2, pl. ii. fig. 3.
1809. *Phytolithus (stellatus)*, Martin, *Petrificata Derbiensia*, pl. xx. figs. 4-6 (non fig. 5).
1820. *Casuarinites equisetiformis*, Schloth., *Petrefactenkunde*, p. 397.
1826. *Bornia equisetiformis*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xxviii.
1841. *Bornia equisetiformis*, Steininger, *Geol. Beschr. d. Landes zw. Saar u. Rheine Nachtr.*, p. 12, fig. 13.
1828. *Asterophyllites equisetiformis*, Brongt., *Prodrome*, p. 158.

1845. *Asterophyllites equisetiformis*, Germar, *Vers. v. Wettin. u. Löbejun.*, p. 21, pl. viii.
 1855. *Asterophyllites equisetiformis*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 8, pl. xvii. fig. 1 (? figs. 2-3).
 1864. *Asterophyllites equisetiformis*, Göppert, *Foss. Flora d. perm. Form.*, p. 36, pl. i. fig. 5.
 1869. *Asterophyllites equisetiformis*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 22, pl. iii. fig. 5.
 1871. *Asterophyllites equisetiformis*, Weiss, *Foss. Flora d. jüngst. Stk. u. Rothl.*, p. 126, pl. xii. fig. 2.
 1874. *Asterophyllites equisetiformis*, Feistmantel (*pars*), *Vers. d. böhm. Ablager.*, Abth. i. p. 116, pl. x. fig. 2 (? fig. 1), pl. xi. (? pl. xii. fig. 2).
 1879. *Asterophyllites equisetiformis*, Lesqx (*pars*), *Coal Flora*, vol. i. p. 35, pl. ii. fig. 3.
 1880. *Asterophyllites equisetiformis*, Zeiller, *Végét. foss. d. terr. houil.*, p. 19, pl. elix. fig. 3.
 1882. *Asterophyllites equisetiformis*, Weiss, *Aus d. Steink.*, p. 10, pl. ix. fig. 45 (zweiter abdr.).
 1882. *Asterophyllites equisetiformis*, Renault, *Cours d. botan. foss.*, vol. ii. p. 112, pl. xviii. fig. 1.
 1883. *Asterophyllites equisetiformis*, Schenk, in *Richthofen's China*, vol. iv. p. 235, pl. xxxvii. fig. 3.
 1883. *Asterophyllites equisetiformis*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part ii. p. 42, pl. vi. figs. 1-2.
 1886. *Asterophyllites equisetiformis*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 368, pl. lviii. figs. 1-7.
 1890. *Asterophyllites equisetiformis*, Renault, *Flore foss. bassin houil. d. Commeny*, part ii. p. 409, pl. xlviii. figs. 3, 4, 5, 7.
 1899. *Asterophyllites equisetiformis*, White, *Foss. Flora Lower Coal Meas. Missouri*, p. 151, pl. lix. fig. 1c.
 1899. *Asterophyllites equisetiformis*, Hofmann and Ryba, *Leitpflanzen*, p. 27, pl. ii. figs. 3-4.
 1900. *Asterophyllites equisetiformis*, Zeiller, *Éléments d. paléobot.*, p. 161, fig. 113.
 1869. *Calamocladus equisetiformis*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 324, pl. xxii. figs. 1, 2, 3.
 1874. *Calamocladus equisetiformis*, Crépin, *Bull. Acad. roy. d. Belgique*, 2 sér., vol. xxxviii. p. 7, pl. ii. figs. 1-3.
 1898. *Calamocladus equisetiformis*, Seward, *Fossil Plants*, p. 335, fig. 87.
 1901. *Calamocladus equisetiformis*, Kidston, *Proc. York. Geol. and Polytech. Soc.*, vol. xiv. part. ii. pp. 203, 215, pl. xxx. fig. 3.
 1836. *Hippurites longifolia*, L. and H., *Fossil Flora*, vol. iii. pls. exc.-exci.
 1869. *Annularia calamitoides*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 349, pl. xxvi. fig. 1.
 1876. *Calamocladus binervis*, Boulay, *Terr. houil. du nord de la France et ses végét. foss.*, p. 22, pl. ii. fig. 1.
 1880. *Asterophyllum equisetiformia*, Schimper, in *Zittel, Handb. d. palæont.*, Abth. ii. p. 175, fig. 131.
 1876. *Calamostachys*, Boulay, *Terr. houil. du nord de la France et ses végét. foss.*, p. 24, pl. i. figs. 1, 1 bis.
 1876. *Calamostachys Germanica*, Weiss, *Steinkohl. Calamar.*, part i. p. 47, pl. xvi. figs. 3-4.
 1883. *Calamostachys Germanica*, Schenk, in *Richthofen's China*, vol. iv. p. 233, pl. xxxvi. fig. 5.

Localities C, D.

Calamocladus charæformis, Sternberg, sp.

1826. *Bechera charæformis*, Sternb., *Essai flore monde prim.*, vol. i. fasc. iv. p. xxx., pl. lv. fig. 3 (? fig. 5).
 1840. *Bechera charæformis*, Morris, in *Prestwick, Trans. Geol. Soc. London*, 2nd ser., vol. v., pl. xxxviii. fig. 2, and explanation to plate.
 1845. *Asterophyllites charæformis*, Unger, *Synop. plant foss.*, p. 33.
 1893. *Calamocladus charæformis*, Kidston, *Trans. York. Nat. Union*, part 18, p. 86.
 1869. *Asterophyllites delicatula*, Roehl (*non Sternb.*) (*pars*), *Vers. d. Steink.-Form. Westph.*, p. 26, pl. ii. fig. 6.
 1875. *Asterophyllites* (?) *minutus*, Andrews, *Descr. of Fossil Plants from the Lower Carb. Strata of Ohio* (*Ohio Geol. Rept.*, vol. ii., *Geol. and Palæont.*), p. 424, pl. li. figs. 4-4a.
 1860. *Asterophyllites gracilis*, Lesqx., in *2nd Rept. of a Geol. Reconnaissance of the Middle and South Counties of Arkansas*, p. 310, pl. ii. fig. 4, 4a.

1879. *Asterophyllites gracilis*, Lesqx. (*pars*), *Coal Flora Atlas*, p. 2, pl. ii. figs. 4, 5, text, vol. i. p. 42; vol. iii. p. 714, pl. xciii. figs. 3-4 (?) (*non* figs. 5-6).
 1883. *Asterophyllites gracilis*, Lesqx. (*pars*), *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part ii. p. 43, pl. vi. figs. 4-5 (*non* fig. 6 ?).
 1887. *Asterophyllites Roehli*, Stur (*pars*), *Calamar. d. Carbon-Flora d. Schatz. Schichten*, p. 209, pl. xiv. figs. 13 a, b, c, pl. xv. b fig. 3.
 1890. *Calamocladus Roehli*, Kidston, *Trans. York. Nat. Union*, part 14, p. 22.

Locality D.

Palæostachya, Weiss.

Palæostachya Ettingshauseni, Kidston, n.sp.

1854. *Calamites communis*, Ett. (*pars*), *Steinkohlenf. v. Radnitz*, p. 24, pl. viii. figs. 1 and 4.
 1869. *Volkmannia elongata*, Roehl (*non* Presl.), *Foss. Flora Steink.-Form. Westph.*, p. 19, pl. vii. fig. 1.
 1869. *Calamostachys typica*, Schimper (*pars*), *Traité d. paléont. végét.*, vol. i. p. 328 (pl. xxiii. fig. 1 ?); vol. iii. p. 457.
 1890. *Calamostachys typica*, Kidston, *Trans. York. Nat. Union*, part 14, p. 23.
 1884. *Calamostachys Ludwigi*, Weiss (*pars*), *Steinkohl. Calamarien*, part ii. p. 163, pl. xviii. fig. 2 (*non* pl. xxii. figs. 1-8, pl. xxiii., pl. xxiv.).

Remarks.—For some time I have been under the impression that SCHIMPER has included two distinct types of Calamitic fructification under the name of *Calamostachys typica*, one a true *Calamostachys*, the *C. Ludwigi*, Carr., and the other a *Palæostachya*.

A Calamitic cone, agreeing in every respect with those included in the above synonymy, is not uncommon in the Middle and Lower Coal Measures, but none of the figured specimens included above have, as far as I am aware, shown the position of the sporangiophore. A few examples which I have lately examined, especially one from Canonbie,* show that the sporangiophores spring from the axils of the bracts, and that these cones are typical members of the genus *Palæostachya*.

For these I propose the name of *Palæostachya Ettingshauseni*, after Dr Constantin von Ettingshausen, by whom this fossil was first figured and described.

Localities C, D. Very plentiful.

Paracalamostachys, Weiss.

(?) Paracalamostachys Williamsoniana, Weiss.

1884. *Paracalamostachys Williamsonia*, Weiss, *Steinkohlen Calamarien*, part. ii. p. 193, pl. xxii. fig. 9.
 1869. *Calamodendron commune*, (?) Binney, *Mem. Lit. and Phil. Soc. Manchester*, 3rd ser., vol. iv. p. 218, pl. vi. fig. 2.

Remarks.—Several small Calamitic cones have been collected, which are most probably referable to this species, but their preservation is too imperfect to admit of a satisfactory determination.

Locality D.

* Reg. No. K/3130.

Lycopodiaceæ.

Lepidodendron, Sternberg.

(?) *Lepidodendron lycopodioides*, Sternberg.

1823. *Lepidodendron lycopodioides*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 2, pp. 29 and 35, pl. xvi. figs. 1, 2, and 4.
 1882. *Lepidodendron lycopodioides*, Renault, *Cours d. botan. foss.*, p. 14, pl. v. fig. 8.
 1886. *Lepidodendron lycopodioides*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 464, pl. lxix. figs. 2-3 (? pl. lxx. fig. 1).
 1902. *Lepidodendron lycopodioides*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. part 2, p. 373, pl. lii. fig. 2.
 1903. *Lepidodendron lycopodioides*, Arber, *Quart. Journ. Geol. Soc.*, vol. lix. p. 12, pl. ii. fig. 5.
 1826. *Lycopodiolites elegans*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. viii.
 1828. *Lepidodendron elegans*, Brongt., *Prodrone*, p. 85.
 1823. *Lycopodiolites selaginoides*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 2, pp. 29 and 35; fasc. 4, p. viii, pl. xvi. fig. 3, pl. xvii. fig. 1.
 1828. *Lycopodiolites selaginoides*, Bischoff, *Kryptogam. Gewächte*, p. 117, pl. xiii. fig. 4.
 1828. *Lepidodendron selaginoides*, Brongt., *Prodrone*, p. 85.
 1834. *Lepidodendron selaginoides*, L. and H., *Fossil Flora*, vol. ii., pl. cxiii.
 1875. *Lycopodites selaginoides*, Feistmantel, *Vers. d. böhm. Ablager.*, Abth. ii. p. 10, pl. i. figs. 3-4 (? pl. ii.).

Remarks.—The specimen from Canonbie was fragmentary, but I have very little doubt as to its belonging to *Lepidodendron lycopodioides*, Sternb.

Lepidodendron lycopodioides, Sternb., is very common in the Middle Coal Measures, and from the examination of many specimens I have satisfied myself that *Lepidodendron selaginoides*, Sternb., is founded on the leafy and younger branches of *Lepidodendron lycopodioides*,—some of my specimens, collected by Mr. W. HEMINGWAY, show the organic union of the two forms.

The *Lepidodendron elegans*, Brongt.,* and Lindley and Hutton,† have been referred by some botanists to *Lepidodendron lycopodioides*, Sternb., but, so far as one can learn the characters of the specimens from the figures given—the mode in which the foliage springs from the stems—suggests rather that they should be referred to *Lepidodendron ophiurus*, Brongt.

Locality F.

Sigillaria, Brongniart.

Sigillaria elegans, Sternberg, sp.

1826. *Favularia elegans*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, pp. xiv and 48, pl. lii. fig. 4.
 1887. *Favularia elegans*, Weiss (copied from Sternb.), *Sigillarien d. preuss. Steink.*, i. Gruppe Favularien, p. 54, pl. xv. fig. 2.
 1828. *Sigillaria elegans*, Brongt., *Prodrone*, p. 65.
 1836. *Sigillaria elegans*, Brongt., *Hist. d. végét. foss.*, p. 438, pl. cxlvi. fig. 1, pl. clv., pl. clviii. fig. 1.
 18—? *Sigillaria elegans*, König., *Icones foss. sectiles*, pl. xv. fig. 184.
 1852. *Sigillaria elegans*, Bronn, *Lethæa geog.*, vol. i. part ii. p. 134, pl. vi. fig. 6.
 1857. *Sigillaria elegans*, Goldenberg (*pars*), *Flora saræp. foss.*, Heft ii. p. 27, pl. vi. figs. 16-17 (non pl. v. figs. 6-13).

* *Hist. d. végét. foss.*, vol. ii., pl. xiv.

† *Fossil Flora*, vol. ii., pl. cxviii.

1869. *Sigillaria elegans*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 96, pl. viii. fig. 9, pl. xxviii. fig. 17 (? pl. xxviii. fig. 6).
1881. *Sigillaria elegans*, Renault, *Cours d. botan. foss.*, vol. i. p. 132, pl. xvii. fig. 4, 4bis.
1881. *Sigillaria elegans*, Achepohl, *Niederrh. Westfäl. Steink.*, p. 35, pl. ix. figs. 20-23; *Ergänzungsblatt*, ii., figs. 13-14.
1882. *Sigillaria elegans*, Weiss, *Aus d. Steink.*, p. 5, pl. i. fig. 2 (zweiter abdr.).
1886. *Sigillaria elegans*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 582, pl. lxxxvii. figs. 1-4.
1887. *Sigillaria elegans*, Weiss, *Sigillarien d. preuss. Steink.*, i. Gruppe Favularien (*Abhandl. d. geolog. Landesanstalt*, vol. vii. Heft 2), p. 32.
1887. *Sigillaria elegans*, Weiss (copied from Brongt.), *Sigillarien d. preuss. Steink.*, i. Gruppe. *Die Favularien*, pl. xv. fig. 5, 5a, 6, 6a, 7.
1899. *Sigillaria elegans*, Hofmann and Ryba, *Leitpflanzen*, p. 89, pl. xvi. fig. 10, 10a.
1899. *Sigillaria elegans*, Zeiller, *Flore foss. bassin houil. d'Héraclee*, p. 79, pl. vi. fig. 20.
1900. *Sigillaria elegans*, Zeiller, *Éléments d. paléobot.*, p. 192, fig. 134.
1901. *Sigillaria elegans*, Potonié, in *Engler-Prantl. Natürliche Pflanzenfam.*, p. 749, fig. 447.
1902. *Sigillaria elegans*, Kidston, *Proc. Yorks. Geog. and Polytech. Soc.*, vol. xiv. part iii. pp. 354, 385, pl. lviii. fig. 3.
1887. *Sigillaria elegans*, var. *regularis*, Weiss, *Sigillarien d. preuss. Steink.*, i. Gruppe. *Die Favularien*, p. 32, pl. x. figs. 38-39.
1887. *Sigillaria elegans*, var. *Brongniartiana*, Weiss, *ibid.*, p. 32, pl. x. figs. 40-50.
1887. *Sigillaria elegans*, var. *tenuimarginata*, Weiss, *ibid.*, p. 32, pl. x. figs. 41 and 43.
1887. *Sigillaria elegans*, var. *communis*, Weiss, *ibid.*, p. 32, pl. x. figs. 44, 45, 47, 48, pl. xi. fig. 60.
1887. *Sigillaria elegans*, var. *squamea*, Weiss, *ibid.*, p. 32, pl. x. figs. 46 and 49.
1836. *Sigillaria hexagona*, Brongt., *Hist. d. végét. foss.*, pl. clv. pl. clviii. fig. 1.
1857. *Sigillaria hexagona*, Goldenberg, *Flora saræp. foss.*, Heft ii., pl. vi. fig. 16.
1882. *Sigillaria hexagona*, Weiss, *Aus d. Steink.*, p. 5, pl. i. fig. 1 (zweiter abdr.).
1887. *Sigillaria hexagona*, Weiss (copied from Brongniart), *Sigillarien d. preuss. Steink.*, i. Gruppe. *Die Favularien*, p. 56 pl. xv. figs. 6, 6a, 7.
1888. *Sigillaria hexagona*, Schenk, *Die fossilen pflanzenreste*, p. 81, fig. 40².
1888. *Sigillaria hexagona*, Toulou, *Die Steinkohlen*, p. 200, pl. iv. fig. 11.
1891. *Sigillaria hexagona*, Solms-Laubach, *Fossil Botany*, p. 243, fig. 26b.
1836. *Sigillaria minima*, Brongt., *Hist. d. végét. foss.*, p. 435, pl. clviii. fig. 2.
1857. *Sigillaria minima*, Goldenberg, *Flora saræp. foss.*, Heft ii. p. 26, pl. vi. fig. 15.
1870. *Sigillaria minima*, Schimper, *Atlas, Traité d. paléont. végét.*, p. 24, pl. lxviii. fig. 3.
1887. *Sigillaria minima*, Weiss (copied from Brongt.), *Sigillarien d. preuss. Steink.*, i. Gruppe. *Die Favularien*, p. 55, pl. xv. figs. 13, 13a.
1887. *Sigillaria minima*, Weiss (copied from Schimper), *ibid.*, p. 62, pl. xv. fig. 20.
1887. *Sigillaria elegantula*, Weiss, *Sigillarien d. preuss. Steink.*, i. Gruppe. *Die Favularien*, p. 44, pl. xiii. figs. 74-78.
1894. *Sigillaria elegantula*, Potonié, *Jahrb. d. k. preuss. geol. Landesanstalt für 1893*, pp. 31, 40, pl. iv. fig. 2.
1887. *Sigillaria elegantula*, var. *regularis*, Weiss, *ibid.*, p. 44, pl. xiii. fig. 74.
1887. *Sigillaria elegantula*, var. *subregularis*, Weiss, *ibid.*, p. 44, pl. xiii. figs. 75-76.
1887. *Sigillaria elegantula*, var. *imperfecta*, Weiss, *ibid.*, p. 44, pl. xiii. fig. 77.
1877. *Sigillaria elegantula*, var. *emarginata*, Weiss, *ibid.*, p. 44, pl. xiii. fig. 78.
1870. *Sigillaria tessellata*, Schimper (non Brongt.) (*pars*), *Traité d. paléont. végét.*, vol. ii. p. 81, pl. lxviii. fig. 3 (? pl. lxviii. fig. 1).
1872. *Favularia*, Williamson, *Phil. Trans.*, vol. clxxii. pp. 221, 235, pl. xxxi. fig. 58.

Remarks.—I possess specimens from the Middle Coal Measures of Yorkshire, collected by Mr W. HEMINGWAY, which agree well with BRONGNIART'S *Sigillaria minima*, but, except in the small size of the scars and their slightly more elongated form, they differ

in no respect from *Sigillaria elegans*, of which I regard *Sigillaria minima* to be a young condition.

Sigillaria elegantula, Weiss, seems to me also to be only a form of *Sigillaria elegans*. The presence of the keels from the two lateral or basal angles of the leaf scar is not a constant character, which is one of the chief specific distinctions. Sometimes one keel only is present, and on a neighbouring leaf cushion they may be entirely absent. Even if the keels were always present, it seems too slight a character on which to found a species.

On a specimen of *Sigillaria elegantula* from Königsgrube, Aachen, received from the late Dr WEISS, few of the cushions show any trace of a keel descending from the lower angles of the leaf scar.

The specimen figured by POTONÉ (*l.c.*) under the name of *Sigillaria elegantula* shows no sign of the keels, and seems to be a typical example of *Sigillaria elegans*.

Localities C, D. Not uncommon.

Pinakodendron, Weiss.

1893. *Pinakodendron*, Weiss, *Die Sigillarien d. preuss. Steinkohlen- und Rothliegenden Gebiete*, ii. Gruppe, der *Subsigillarien*,—*Abhandl. d. Königl. preuss. geol. Landesanstalt, Neue Folge*, Heft 2, p. 61.

Description.—Stems with small distant quincuncially placed leaf scars. Outer surface of cortex ornamented with very fine raised lines, which unite to form a fine net-like reticulation.

Remarks.—The genus is closely related to *Bothrodendron*, L. and H., but easily distinguished by the net-like reticulation of the outer surface of the cortex and the form of the leaf scars on the hitherto discovered species of the genus.

WEISS describes two species—*Pinakodendron musivum** and *Pinakodendron Ohmanni*.†

In *Pinakodendron musivum* the leaf scars are oval-upright and placed in a slight depression, which is surrounded on the lower margin by a slight ridge. The surface ornamentation both above and below the leaf scars is very fine and faint, and the space so occupied forms an elongated rhomboidal area, of which the centre is occupied by the leaf scar.

In *Pinakodendron Ohmanni* the leaf scar is of very peculiar form. It consists of an upper transversely elongated triangular area, apparently not always clearly defined, with two or three cicatricules placed immediately above a transverse ridge which separates this upper portion from the lower triangular shield-shaped part, which has a small circular depression at its basal extremity. I am inclined to regard the lower shield-shaped portion the leaf scar proper, and that the cicatricules above this are probably so-called ligule pits. Unless this be the explanation of the structure, the leaf scar is other-

* *l.c.*, p. 61, pl. iii. figs. 16, 16a.

† *l.c.*, p. 62, pl. iii. figs. 17, 17a, 18, 18a.

wise difficult to understand; and as pointing to this being the correct explanation, the upper shield is only present on the part shown at fig. 18a. The vascular impression is therefore not clearly seen on any of the specimens yet discovered.

The occurrence of the genus at Canonbie is an interesting addition to the British Palæozoic flora.

Pinakodendron Macconochiei, Kidston, n.sp.

(Plate I. figs. 9-11.)

Description.—Leaf scars distant, upright-oval, very small, about 2 mm. high and 1.50 mm. broad. Cortex ornamented with a very fine irregular meshwork formed of little ridges. Vascular cicatricules not visible.

Remarks.—The only specimen discovered is shown natural size on Pl. I. fig. 10, and a portion enlarged three times at fig. 9. A still further enlarged sketch of the ornamentation of the outer surface of the bark is given at fig. 11. The surface ornamentation becomes very fine immediately above and below the leaf scars.

Pinakodendron Macconochiei differs from both the species described by WEISS in the much more irregular meshwork ornamentation of the cortex, and is further distinguished from *Pinakodendron musivum*, Weiss, by the absence of the surrounding elevated rim of the little semi-pit-like structure in which the leaf scar is placed, and from *Pinakodendron Ohmanni*, Weiss, by its oval leaf scar.

Locality D.

Stagmaria, Brongniart.

Stagmaria ficoides, Sternberg, sp.

Stagmaria ficoides, Sternb., sp. *Ante*, p. 757.

Locality D.—The ordinary form and another with closer and slightly small scars were collected.

Sphenophyllaceæ.

Sphenophyllum, Brongniart.

Sphenophyllum cuneifolium, Sternb., sp. *Ante*, p. 778.

Locality C.—*Sphenophyllum cuneifolium* and var. *saxifragæfolium*, were met with here.

Locality D.—Only *Sphenophyllum cuneifolium* was collected at this locality.

Cordaiteæ.

Cordaites, Unger.

Cordaites principalis, Germar, sp.

1848. *Flabellaria principalis*, Germar, *Vers. v. Wettin. u. Löbejun*, p. 55, pl. xxiii.
 1869. *Flabellaria principalis*, Roehl, *Foss. Flora Steink.-Form. Westph.*, p. 163, pl. xx. figs. 1-2.
 1855. *Cordaites principalis*, Geinitz (*pars*), *Vers. d. Steinkf. in Sachsen*, p. 41, pl. xxi. fig. 1, 2, 2a, 2b.
 1864. *Cordaites principalis*, Göpp., *Foss. Flora. d. perm. Form.*, p. 159, pl. xxii. figs. 6-9.
 1876. *Cordaites principalis*, Heer, *Flore foss. Helv.*, Lief. i. p. 55, pl. i. figs. 1b, 12-16.
 1882. *Cordaites principalis*, Weiss, *Aus d. Steink.*, p. 19, pl. xx. fig. 114 (zweiter abdr.).
 1883. *Cordaites principalis*, Schenk, in *Richthofen's China*, vol. iv. pp. 213, 228, pl. xxx. figs. 11-12, pl. xlv. figs. 3, 3a.
 1886. *Cordaites principalis*, Sterzel, *Flora d. Rothl. in Nordw. Sachsen*, p. 32, pl. iii. figs. 6-9, pl. iv. figs. 1-3 (? figs. 4-5).
 1886. *Cordaites principalis*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 629, pl. xciii. fig. 3, pl. xciv. fig. 1.
 1893. *Cordaites principalis*, Potonié, *Flora d. Rothl. von Thüringen*, p. 210, pl. i. fig. 5.
 1893. *Cordaites principalis*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxvii. p. 352, pl. ii. figs. 8, 8a, pl. iv. figs. 16-17.
 1895. *Cordaites principalis*, Sterzel, *Flora d. Rothl. von Oppenau*, p. 308, pl. ix. figs. 6-8 (*Mitt. d. Badischen Geol. Landesanstalt*, iii. Band, 2 Heft).
 1899. *Cordaites principalis*, Hofmann and Ryba, *Leitpflanzen*, p. 99, pl. xix. fig. 6, 6a.
 1902. *Cordaites principalis*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. part 3, pp. 363, 375, 383, 397, pl. liii. fig. 1, pl. lvii. fig. 2, pl. lxiv. fig. 3.
 1870. *Pycnophyllum principale*, Schimper, *Traité d. paléont. végét.*, vol. ii. p. 191.
 1833. *Kuorria taxina*, L. and H., *Fossil Flora*, vol. ii. pl. xcv.A (*stem*).

Localities C, D. Frequent.

Cordaianthus, Grand' Eury.

(?) *Cordaianthus Pitcairniæ*, L. and H., sp.

Cordaianthus Pitcairniæ, L. and H., sp. See *ante*, p. 782.

Locality C.

Cordaianthus Volkmanni, Ettingshausen, sp.

1852. *Calamites Volkmanni*, Ett. (*pars*), *Steinkf. v. Stradonitz*, p. 5, pl. v. figs. 1-3 (*non* fig. 4, *non* pl. vi. figs. 1-2).
 1886. *Cordaianthus Volkmanni*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 637, pl. xciv. fig. 6.
 1874. *Antholithus parviflorus*, Schimper, *Traité d. paléont. végét.*, vol. iii. p. 567, pl. cx. figs. 1-3.

Locality D.

Cordaianthus, sp.

Locality D.

Cordaicarpus, Geinitz.

Cordaicarpus Cordai, Geinitz, sp.

(Plate I. figs. 12-13.)

1855. *Carpolithus Cordai*, Geinitz, *Vers. d. Steinkf. in Sachsen*, p. 41, pl. xxi. figs. 7-16.1876. *Carpolithus Cordai*, Boulay, *Terr. houil. du nord de la France*, p. 50, pl. i. fig. 4.1861. *Cordaicarpon Cordai*, Geinitz, *Dyas.*, p. 150.1886. *Cordaicarpus Cordai*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 645, pl. xciv. fig. 13.1871. *Cyclocarpus Cordai*, Weiss, *Foss. Flore d. jüngst. Stk. u. Rothl.*, p. 207.1886. *Cyclocarpus Cordai*, Sterzel, *Flora d. Rothl. im. nordw. Sachsen*, p. 68 (? pl. ix. fig. 4).1899. *Cyclocarpus Cordai*, Hofmann and Ryba, *Leitpflanzen*, p. 101, pl. xix. figs. 15-18.

Description.—Seed smooth, lenticular in section, with a more or less circular contour, very feebly apiculate at the summit, and sometimes slightly cordate at the base, generally surrounded by a narrow keel or border. They vary in size from 7 mm. to 20 mm.

Remarks.—The narrow surrounding keel or border probably results from pressure, and may represent the pericarp by which the harder nucule was surrounded. Only a single specimen was met with at Canonbie, but the seed occurs at other localities in the Middle Coal Measures of England.

At Plate I. fig. 12 the seed is shown natural size, and at fig. 13 it is enlarged three times.

Locality C.

Carpolithes, Schlotheim.

Carpolithes, sp.

Locality D.

Artisia, Sternberg.

Artisia, sp.

Locality D.

The following table shows the vertical distribution of the fossil plants from the Middle Coal Measures of the Byre Burn series.

	U. C. M.	M. C. M.	L. C. M.
<i>Sphenopteris obtusiloba</i> , Brongt.,		×	×
„ <i>Laurenti</i> , Andræ,		×	×
„ <i>mixta</i> , Schimper,		×	
„ <i>Hæninghausi</i> , Brongt.,		×	×
„ <i>multifida</i> , L. and H.,		×	
<i>Pecopteris</i> , sp.,			
<i>Mariopteris muricata</i> , Schloth., sp.,	×	×	×
<i>Alethopteris lonchitica</i> , Schloth., sp.,	×	×	×
„ <i>Davreuxi</i> , Brongt., sp.,	×	×	
„ <i>Grandini</i> , Brongt., sp.,	×	×	
<i>Neuropteris heterophylla</i> , Brongt.,		×	×
„ <i>gigantea</i> , Sternb.,		×	×
<i>Calamites unclulatus</i> , Sternb.,	×	×	×
„ <i>Schützei</i> , Stur,		×	×
„ <i>pauciramis</i> , Weiss,		×	*
„ <i>ramosus</i> , Artis,	×	×	×
„ <i>Suckowii</i> , Brongt.,	×	×	×
„ <i>Cistii</i> , Brongt.,	×	×	×
<i>Calamocladus equisetiformis</i> , Schloth., sp.,	×	×	×
„ <i>charæformis</i> , Sternb., sp.,		×	
<i>Palæostachya Ettingshauseni</i> , Kidston, n.sp.,		×	×
Cf. <i>Paracalamostachys Williamsoniana</i> , Weiss,		?	×
<i>Annularia radiata</i> , Brongt., see <i>Calamites romosus</i> , Artis,		×	×
<i>Lepidodendron</i> , cf. <i>lycopodioides</i> , Sternb.,		×	×
<i>Sigillaria elegans</i> , Sternb., sp.,		×	×
<i>Pinakodendron Macconochiei</i> , Kidston, n.sp.,		×	*
<i>Stipmaria ficoides</i> , Sternb., sp.,	×	×	×
<i>Sphenophyllum cuneifolium</i> , Sternb., sp.,		×	×
„ „ var. <i>saxifragæfolium</i> , Stbg. (sp.),		×	×
<i>Cordaite principalis</i> , Germar, sp.,		×	×
<i>Corlaianthus</i> , cf. <i>Pitcairnia</i> , L. and H., sp.,		×	×
„ <i>Volkmanni</i> , Ett., sp.,		×	
<i>Cordaicarpus Cordai</i> , Geinitz, sp.,		×	
<i>Carpolithes</i> , sp.,			
<i>Sternbergia</i> , sp.,			

Of the Byre Burn group of fossil plants a few extend into the Upper Coal Measures of England, but these belong to those species which are common to all three divisions of the Coal Measures, with the exception of *Alethopteris Davreuxi*, Brongt., sp., and *Alethopteris Grandini*, Brongt., sp., which were fairly plentiful at Localities C and D, which, however, as already mentioned, are different portions of the same bed. I have not previously met with *Alethopteris Grandini*, Brongt., sp., below the Upper Coal Measures.

A greater number of the Byre Burn plants also occur in the Lower Coal Measures, but after deducting these there are several left which are peculiar to the Middle Coal Measures, as far as at present known. These are *Sphenopteris mixta*, Schimper, *Sphenopteris multifida*, L. and H., *Calamites pauciramis*, Weiss, *Calamocladus charæformis*,

* These are the first British records, but their horizon on the Continent corresponds to our Middle Coal Measures.

Sternb., sp., *Pinakodendron Macconochi*, Kidston, n.sp., *Cordaianthus Volkmani*, Ett., sp., and *Cordaicarpus Cordai*, Geinitz, sp. Though *Sphenopteris Laurenti*, Andræ, and *Sigillaria elegans*, Sternb., sp., also occur in the Lower Coal Measures, they are very rare in that horizon, and are much more characteristic of the Middle Coal Measures.

From the evidence afforded by the fossil plants, I have no hesitation in classing the Byre Burn group with the Middle Coal Measures of Britain.

FOSSIL PLANTS OF THE UPPER COAL MEASURES. (*The Red Shales.*)

These occupy a considerable tract of ground, and are well exposed in many places in the parish of Canonbie and in the neighbouring part of Cumberland.

The series as a whole is extremely barren of fossils, though it offers many good sections along the river Esk and the Liddel Water; and though these sections were more or less carefully examined by Mr MACCONOCHIE and myself, they did not yield a single fossil plant.

At Jockie's Syke, in Cumberland, one mile east by north of Riddings Junction, where in 1879 Mr MACCONOCHIE found a few small specimens in this series, we were successful in discovering plant remains in three different bands.

The section here is, however, high up in the series, and for this portion of it the fossils indicate an Upper Coal Measure age.

It is very unfortunate that the lower portion of the series along the river Esk and Liddel Water is so barren (though plants may still be found in it, for the extent of ground to examine is considerable); for if the rocks form a continuous series with the Byre Burn Middle Coal Measures (though there may possibly be a fault between them), one would expect to find in the lower portion of the 'Red Shales' a transition flora composed partly of Middle and partly of Upper Coal Measure plants, similar to the series which occurs above the Middle Coal Measures in the Potteries Coalfield, and to which I have applied the name of the *Transition series*.*

From the absence of any plant remains in the *lower beds* of these 'Red Shales,' I am unable to determine whether they belong to this Upper Transition series or to the Upper Coal Measures.

The flora of the upper beds, however, as developed in Jockie's Syke, have a distinct Upper Coal Measure facies; and though one misses from the list of plants collected there several of the *Pecopteris-Cyatheites* group, some do occur, but their preservation is so unsatisfactory that it is impossible to determine them specifically, as the nervation is seldom shown.

It is sometimes difficult to draw the exact line between the Upper Transition series

* KIDSTON, "On the various Divisions of British Carboniferous Rocks as determined by their Fossil Flora," *Proc. Roy. Phys. Soc. Edin.*, vol. xii. pp. 228-229, 1894. Also "Additional Records and Notes on the Fossil Flora of the Potteries Coalfield, North Staffordshire," *Trans. N. Staffordshire Field Club*, 1897, Stoke-upon-Trent.

and the Upper Coal Measures, for they are only the upper and lower ends of a continuous chain, but taking all the available evidence into consideration, we must class that portion of the 'Red Shales' which are met with at Jockie's Syke with the Upper Coal Measures.

The following are the localities from which the plants were collected in Jockie's Syke, one mile east by north of Riddings Junction, Cumberland:—

- A. Jockie's Syke. The original locality discovered by Mr MACCONOCHIE in 1879, the exact position of which cannot now be determined.
- B. Jockie's Syke. Streamlet entering on right of main stream, 30 yards south of North British Railway. In soft red and greenish shales.
- C. Jockie's Syke. Main stream in Syke, about 125 yards above railway. In purplish shale.
- D. Jockie's Syke. Main stream of Syke, about 300 yards above railway. In purplish clayey shale.

Filicaceæ.

Pecopteris, Brongniart.

(?) *Pecopteris arborescens*, Schlotheim, sp.

- 1804. Schlotheim, *Flora d. Vorwelt*, p. 41, pl. viii. fig. 13.
- 1820. *Filicites arborescens*, Schloth., *Petrefactenkunde*, p. 404.
- 1826. *Pecopteris arborea*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xviii.
- 1828. *Pecopteris arborescens*, Brongt., *Prodrôme*, p. 56.
- 1833. *Pecopteris arborescens*, Brongt., *Hist. d. végét. foss.*, p. 310, pl. cii. figs. 1-2, pl. ciii. figs. 2-3.
- 1838. *Pecopteris arborescens*, Sternb. (pars), *Essai flore monde prim.*, vol. ii. fasc. 7-8, p. 147.
- 1848. *Pecopteris arborescens*, Gutbier, *Vers. d. Rothl. in Sachsen*, p. 16, pl. ii. fig. 9.
- 1851. *Pecopteris arborescens*, Germar, *Vers. v. Weittin u. Löbejun*, p. 97, pl. xxxiv. figs. 1-3, pl. xxxv. figs. 5-7 (? fig. 4).
- 1865. *Pecopteris arborescens*, Heer, *Urwelt d. Schweiz*, p. 13, pl. i. fig. 8.
- 1876. *Pecopteris arborescens*, Roemer, *Lethæa geog.*, vol. i. p. 176, pl. lviii. fig. 3 (? pl. lii. fig. 4).
- 1877. *Pecopteris arborescens*, Grand'Eury, *Flore carbon. d. Départ. de la Loire*, p. 68, pl. viii. fig. 6.
- 1879. *Pecopteris arborescens*, Schimper, in *Zittel, Handb. d. Palæont.* ii. Abth., *Palæophyt.*, p. 127, fig. 103.
- 1880. *Pecopteris arborescens*, Zeiller, *Végét. foss. d. terr. houil.*, p. 81, pl. clxix. fig. 4.
- 1879. *Pecopteris arborescens*, Lesqx., *Coal Flora*, vol. i. p. 230, pl. xli. figs. 6-7.
- 1883. *Pecopteris arborescens*, Renault, *Cours d. botan. foss.*, vol. iii. p. 108, pl. xvii. figs. 1-2.
- 1888. *Pecopteris (Asterotheca) arborescens*, Zeiller, *Flore foss. bassin houil. d. Commentry*, p. iii. pl. xi. figs. 1-2.
- 1890. *Pecopteris arborescens*, Grand'Eury, *Bassin houil. du Gard*, p. 274, fig. D.
- 1890. *Pecopteris (Asterotheca) arborescens*, Zeiller, *Flore foss. bassin houil. et perm. d'Autun et d'Épinac*, i. part, p. 43, pl. viii. fig. 1.
- 1893. *Pecopteris (Scoleopteris) arborescens*, Sterzel, *Flora d. Rothl. im Plauen. Grunde bei Dresden*, p. 17, pl. i. figs. 16-17.
- 1893. *Pecopteris arborescens*, Potonié (pars), *Flora d. Rothl. v. Thüringen*, p. 57, pl. vi. figs. 6-7 (non fig. 5).
- 1899. *Pecopteris arborescens*, Hofmann and Ryba, *Leitpflanzen*, p. 50, pl. vi. figs. 6-8.
- 1901. *Pecopteris arborescens*, Kidston, *Proc. Yorks. Geol. and Polytech. Soc.*, vol. xiv. part ii. pp. 194, 209, pl. xxvii. fig. 3.

1836. *Cyatheites arborescens*, Göpp., *Syst. fil. foss.*, p. 321.
 1876. *Cyatheites arborescens*, Feistmantel, *Vers. d. böhm. Ablager.*, iii. Abth., p. 70, pl. xviii. figs. 6, 6a.
 1876. *Cyatheites arborescens*, Heer, *Foss. Flora Helv.*, p. 27, pl. viii. figs. 1-4.
 1883. *Cyatheites arborescens*, Schenk, in *Richthofen's China*, vol. iv. p. 212, pl. xlv. figs. 14-16.
 1873. *Cyatheites arborescens*, Feistmantel, *Zeitsch. d. d. deut. geol. Gesell.*, vol. xxv. p. 600, pl. xviii. figs. 15, 15a.
 1869. *Cyathocarpus arborescens*, Weiss, *Foss. Flora d. jüngst. Stk. u. Rothl.*, p. 84.
 1877. *Asterotheca arborescens*, Stur, *Culm Flora*, Heft ii. p. 293.
 1883. *Scolecopteris arborescens*, Stur, *Morph. u. Syst. d. Culm u. Carbon Farne*, p. 102, fig. 20a, p. 122.
 1885. *Scolecopteris arborescens*, Stur, *Carbon-Flora d. Schatz. Schichten, Die Farne*, p. 196, fig. 24a.
 1861. *Cyatheites Schlotheimi*, Göpp. (*pars*), *Foss. Flora d. perm. Form.*, p. 120, pl. xv. fig. 1.

Remarks.—The specimens included here agree entirely with *Pecopteris arborescens* in size and form of the pinnules, but as the nervation is not clearly shown, the record is marked with a 'query.'

Locality A.

Pecopteris (Cyatheites), sp.

Remarks.—Possibly more than one species is included here, but as the specimens are fragmentary and the nervation not shown, it is impossible to determine them specifically with any degree of certainty. It is rather remarkable that among the *Pecopteris* none of the specimens showed the nervation, whereas in some of the other ferns found with them the nervation was clearly seen.

Localities B, D.

Alethopteris, Sternberg.

Alethopteris aquilina, Schlotheim, sp.

1804. Schlotheim, *Flora d. Vorwelt*, p. 34, pl. iv. fig. 7, pl. v. fig. 8.
 1820. *Filicites aquilinus*, Schloth., *Petrefactenkunde*, p. 405.
 1828. *Pecopteris aquilina*, Brongt., *Prodrome*, p. 56.
 1836. *Alethopteris aquilina*, Göpp., *Syst. fil. foss.*, p. 298.
 1826. *Pecopteris affinis*, Sternb., *Essai flore monde prim.*, vol. i. fasc. iv. p. xx.
 1828. *Pecopteris Schlotheimii*, Brongt., *Prodrome*, p. 57.

Remarks.—The examples from Jockie's Syke agree entirely with SCHLOTHEIM'S figures. I will not at present enter into the question of the identity or otherwise of BRONGNIART'S *Pecopteris aquilina** with SCHLOTHEIM'S plant, as I hope at another time to publish some notes on this subject.

Localities B, C.

Alethopteris Grandini, Brongniart, sp.

Alethopteris Grandini, Brongt. See *ante*, p. 787.

Locality B.

* *Hist. d. végét. foss.*, p. 284, pl. xc.

Alethopteris Serlii, Brongniart, sp.

1804. Parkinson, *Organic Remains*, vol. i. pl. iv. fig. 6.
 1828. *Pecopteris Serlii*, Brongt., *Prodrome*, p. 57.
 1832 or 1833. *Pecopteris Serlii*, Brongt., *Hist. d. végét. foss.*, p. 292, pl. lxxxv.
 1837. *Pecopteris Serlii*, L. and H., *Fossil Flora*, vol. iii., pl. ccii.
 1836. *Alethopteris Serlii*, Göpp., *Syst. fil. foss.*, p. 301, pl. xxi. figs. 6-7.
 1862. *Alethopteris Serlii*, Roemer, *Palæont.*, vol. ix. p. 32, pl. viii. fig. 9.
 1876. *Alethopteris Serlii*, Roemer, *Lethæa geol.*, vol. i. p. 181, pl. lii. figs. 2a, 2b.
 1879. *Alethopteris Serlii*, Lesqx., *Coal Flora*, vol. i. p. 176, pl. xxix. figs. 1-5.
 1880. *Alethopteris Serlii*, Zeiller, *Végét. foss. d. terr. houil.*, p. 75, pl. clxiii. figs. 1-2.
 1882. *Alethopteris Serlii*, Weiss, *Aus d. Steink.*, p. 16, pl. xvi. fig. 97 (zweiter abdr.).
 1883. *Alethopteris Serlii*, Renault, *Cours d. botan. foss.*, vol. iii. p. 157, pl. xxvii. fig. 7.
 1886. *Alethopteris Serlii*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 234, pl. xxxvi. figs. 1-2, pl. xxxvii. figs. 1-2.
 1888. *Alethopteris Serlii*, Toulou, *Die Steinkohlen*, p. 189, pl. i. figs. 31-32.
 1899. *Alethopteris Serlii*, White, *Fossil Flora Lower Coal Meas. of Missouri*, p. 117, pl. xxxvii. fig. 1.
 1899. *Alethopteris Serlii*, Hofmann and Ryba, *Leitpflanzen*, p. 56, pl. viii. figs. 2, 3.
 1899. *Alethopteris Serlii*, var. *Missouriensis*, White, *Foss. Flora Lower Coal Meas. of Missouri*, p. 118, pl. xxxvii. fig. 2, pl. xlii. fig. 5.
 1848. *Pecopteris Hannonica*, Sauveur, *Végét. foss. terr. houil. Belgique*, pl. xxxviii.
 1854. *Alethopteris Sternbergii*, Ettingshausen, *Steink. v. Radnitz*, p. 42, pl. xviii. fig. 4.
 1869. (?) *Alethopteris irregularis*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 81, pl. xv. figs. 2, 14 and 15.
 1879. *Alethopteris lonchitica*, Schimper (non Schloth.), in Zittel, *Handb. d. Palæont.*, ii. Abth., *Palæophyt.*, p. 118, fig. 93¹.

Localities B, C.

Alethopteris, sp.

Locality D.

Neuropteris, Brongniart.*Neuropteris ovata*, Hoffmann.

1826. *Neuropteris ovata*, Hoffmann, in Keferstein, *Teuchland geognostisch-geolog. dargestellt.*, vol. iv. p. 158, pl. 1b, figs. 5, 6, 7 (non fig. 8).
 1887. *Neuropteris ovata*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 359, pl. xii. fig. 1, 1a.

Remarks.—The fern figured by Roemer under this name appears to be specifically distinct from Hoffmann's species.* The *Neuropteris ovata*, Germar,† is the *Callipteridium pteridum*, Schlotheim, sp.‡

Locality B.

Neuropteris flexuosa, Sternberg.

1824. *Neuropteris gigantea*, var. β Sternb., *Essai flore monde prim.*, vol. i. fasc. 3, p. 44, pl. xxxii. fig. 2.

* *Beitr. z. geol. Kenntniss d. nordwestl. Harzgebirges*, iv. Abth., *Palæont.*, vol. ix. p. 28, pl. vi. fig. 1.

† *Vers. von Wettin u. Löbejun*, p. 33, pl. xii., 1845.

‡ *Flora d. Vorwelt*, p. 59, pl. xiv. fig. 27, *Petrefactenkunde*, p. 406.

1826. *Neuropteris flexuosa*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xvi; vol. ii. fasc. 5-6, p. 71.
1828. *Neuropteris flexuosa*, Brongt., *Prodrome*, p. 53.
1830. *Neuropteris flexuosa*, Brongt., *Hist. d. végét. foss.*, p. 239, pl. lxv. figs. 2-3, pl. lxviii. fig. 2.
1835. *Neuropteris flexuosa*, Gutbier, *Vers. d. Zwick. Schwarzk.*, p. 56, pl. vii. figs. 1, 2, 5, 7 (? pl. vi. fig. 12, pl. vii. figs. 10-13).
1869. *Neuropteris flexuosa*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 35, pl. xii. fig. 3a, pl. xv. figs. 3 and 10 (? pl. iv. fig. 1b).
1869. *Neuropteris flexuosa*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 434, pl. xxx. figs. 12-13.
1870. *Neuropteris flexuosa*, Unger, *Sitzungsb. d. Math. Naturw. Classe*, vol. lx. i. Abth. p. 785 (pl. ii. figs. 1-2 ?).
1876. *Neuropteris flexuosa*, Feistmantel, *Vers. d. böhm. Ablager.*, Abth. iii. p. 64, pl. xvi. figs. 5-6.
1876. *Neuropteris flexuosa*, Heer (pars), *Foss. Flora Helv.*, Lief. i. p. 20, pl. iv. figs. 7-13, pl. v. fig. 3.
1876. *Neuropteris flexuosa*, Roemer, *Lethæa geog.*, vol. i. p. 183, pl. li. fig. 5a, 5b.
1880. *Neuropteris flexuosa*, Rothpletz, *Steinkohlf. an der Ost des Todi*, p. 5, pl. i. figs. 8-9.
1882. *Neuropteris flexuosa*, Weiss, *Aus d. Steink.*, p. 15, pl. xv. fig. 90 (zweiter abdr.).
1883. *Neuropteris flexuosa*, Renault, *Cours d botan. foss.*, vol. iii. p. 169, pl. xxix. figs. 10-11.
1886. *Neuropteris flexuosa*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 277 (? pl. xli. fig. 2).
1888. *Neuropteris flexuosa*, Toulou, *Die Steinkohlen*, p. 189, pl. i. figs. 34-35.
1830. *Neuropteris rotundifolia*, Brongt., *Hist. d. végét. foss.*, p. 238, pl. lxx. fig. 1.
1835. *Neuropteris rotundifolia*, Gutbier, *Vers. d. Zwick. Schwarzk.*, p. 56, pl. vii. figs. 3-4.
1879. *Neuropteris rotundifolia*, ? Lesquereux, *Coal Flora*, vol. i. p. 97, pl. xiii. fig. 8.
1888. *Neuropteris flexuosa*, var. *rotundifolia*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. part. ii. p. 359.
1880. *Neuropteris flexuosa*, var. *Grangeri*, Rothpletz (non Brongt.), *Steinkohlf. an der Ost des Todi*, p. 5, pl. i. fig. 7.

Localities A, B, C, D.

Neuropteris Scheuchzeri, Hoffmann.

1826. *Neuropteris Scheuchzeri*, Hoffm., in *Keferstein's Teuchland geognostisch geol. dargestellt*, vol. iv. p. 156, pl. i. b figs. 1-4.
1882. *Neuropteris Scheuchzeri*, Zeiller, *Flore houil. d. Asturies*, p. 6 (*Mém. Soc. Geol. du Nord*).
1886. *Neuropteris Scheuchzeri*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 251, pl. xli. figs. 1-3.
1888. *Neuropteris Scheuchzeri*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 356, pl. xxiii. figs. 1-2.
1899. *Neuropteris Scheuchzeri*, Zeiller, *Flore foss. d. bassin houil. d'Héraclée*, p. 42, pl. iv. fig. 9.
1899. *Neuropteris Scheuchzeri*, White, *Foss. Flora Lower Coal Meas. of Missouri*, p. 132, pl. xlii. fig. 3, pl. lxiv. fig. d.
1830. *Neuropteris angustifolia*, Brongt., *Hist. d. végét. foss.*, p. 231, pl. lxiv. figs. 3-4.
1883. *Neuropteris angustifolia*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part ii., *Palæont.*, p. 52, pl. x. fig. 1.
1830. *Neuropteris acutifolia*, Brongt., *Hist. d. végét. foss.*, p. 231, pl. lxiv. figs. 6-7.
1835. *Neuropteris acutifolia*, Gutbier, *Vers. d. Zwick. Schwarzk.*, p. 52 (? pl. vii. fig. 6).
1854. *Neuropteris acutifolia*, Ett., *Foss. Flora v. Radnitz*, p. 32, pl. xviii. fig. 5.
1855. *Neuropteris acutifolia*, Geinitz, *Vers. d. Steink. in Sachsen*, p. 22 (? pl. xxvii. fig. 8).
1899. *Neuropteris acutifolia*, Hofmann and Ryba, *Leitpflanzen*, p. 65, pl. ix. fig. 11 (? figs. 1-2).
1847. *Neuropteris cordata*, var. *angustifolia*, Bunbury, *Quart. Journ. Geol. Soc.*, vol. iii. p. 424, pl. xxi. fig. 1b.
1832. *Neuropteris cordata*, L. and H. (non Brongt.), *Fossil Flora*, vol. i. pl. xli.
1847. *Neuropteris cordata*, Bunbury (non Brongt.), *Quart. Journ. Geol. Soc.*, vol. iii. pp. 423 and 437, pl. xxi. figs. 1a, 1c, 1d, 1e, 1f.

1868. *Neuropteris cordata*, Dawson (*non* Brongt.), *Acad. Geol.*, 2nd ed. pp. 482, 466, fig. 166b.
 1888. *Neuropteris cordata*, Kidston (*non* Brongt.) (*pars*), *Catal. Palæoz. Plants*, p. 98.
 1858. *Neuropteris hirsuta*, Lesqx., in *Royers, Geol. of Pennsylv.*, vol. ii. p. 857, pl. iii. fig. 6, pl. iv. figs. 1-16.
 1866. *Neuropteris hirsuta*, Lesqx., *Rept. Geol. Survey of Illin.*, vol. ii. p. 427, pl. xxxv. figs. 6-10.
 1879. *Neuropteris hirsuta*, Lesqx., *Coal Flora*, vol. i. p. 88, pl. viii. figs. 1, 4, 5, 7, 9, 12.
 1880. *Neuropteris hirsuta*, White, *Indiana 2nd Ann. Rept. Dept. Statistics and Geol.*, p. 520, pl. ix. figs. 1-3.
 1862. *Dictyopteris cordata*, Roemer, *Palæont.*, vol. ix. p. 30, pl. vi. fig. 4.
 1869. *Dictyopteris cordata*, Roehl, *Foss. Flora Steink.-Form. Westph.*, p. 50 (? pl. xv. fig. 6, pl. xxi. fig. 7b).
 1862. *Dictyopteris Scheuchzeri*, Roemer, *Palæont.*, vol. ix. p. 30, pl. ix. fig. 1.
 1869. *Dictyopteris Scheuchzeri*, Roehl, *Foss. Flora Steink.-Form. Westph.*, p. 49 (? pl. xxi. fig. 12).

Note.—*Neuropteris Scheuchzeri*, Hoffm., was the species most plentifully met with at Jackie's Syke.

Localities B, D.

Equisetaceæ.

Calamites, Suckow.

Calamites (Calamitina) undulata, Sternberg.

Calamites (Calamitina) undulata, Sternb. See *ante*, p. 776.

Locality B.

Calamites (Calamitina), sp.

Locality B.

Calamocladus, Schimper.

Calamocladus equisetiformis, Schlotheim, sp.

Calamocladus equisetiformis, Schloth., sp. See *ante*, p. 792.

Locality B.

Annularia, Sternberg.

Annularia radiata, Brongniart.

See *Calamites (Eucalamites) ramosus*, *ante*, p. 790.

Locality B. Frequent, but mostly confined to a single layer.

Annularia stellata, Schlotheim, sp.

1723. Scheuchzer, *Herb. diluv.*, pl. xiii. fig. 3.
 1760. Luid, *Lith. Brit. Ichnographia*, p. 12, pl. v. fig. 201.
 1804. Schlotheim, *Flora d. Vorwelt*, p. 32, pl. i. fig. 4.
 1820. *Casuarinites stellatus*, Schloth., *Petrefactenkunde*, p. 397.
 1826. *Bornia stellata*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. xxviii.

1860. *Annularia stellata*, Wood, *Proc. Acad. Nat. Sciences Phil.*, p. 236.
1880. *Annularia stellata*, Zeiller, *Végét. foss. d. terr. houil.*, p. 26, pl. clx. figs. 2-3.
1886. *Annularia stellata*, Zeiller, *Flore foss. bassin houil. d. Valen.*, p. 398, pl. lxi. figs. 3-6.
1887. *Annularia stellata*, Stur, *Calamarien d. Carbon-Flora d. Schatz. Schichten*, p. 55, pl. xiii. b fig. 3, pl. xiii. b. bis, fig. 3.
1889. *Annularia stellata*, Renault (*pars*), *Flore foss. terr. houil. d. Commeny*, part ii. p. 398, pl. xlv. figs. (? 1) 2-7, pl. xlvi. figs. 1-6 (*non* pl. xlvii. figs. 1-2).
1892. *Annularia stellata*, Potonié, *Naturwiss. Wochenschrift*, No. 51, p. 520, figs. 1-2.
1893. *Annularia stellata*, Potonié, *Flora d. Rothl. v. Thüringen*, p. 162, pl. xxiv. figs. 1-6.
1896. *Annularia stellata*, Renault, *Bassin houil. et perm. d'Autun et d'Épinac.*, fasc. iv. *Flore foss. Deux. part.*, p. 67, pl. xxviii. figs. 1, 3, 4.
1898. *Annularia stellata*, Seward, *Fossil Plants*, p. 338, fig. 88.
1899. *Annularia stellata*, Frech, *Lethæa geog.*, i. Theil, *Lethæa palæoz.*, 2 Band, 2 Lief, *Steinkohlenform.*, pl. 1. b. fig. 1.
1899. *Annularia stellata*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 200, fig. 195.
1899. *Annularia stellata*, White, *Foss. Flora of Lower Coal Meas. of Missouri*, p. 159, pl. xxiv. fig. 3b.
1828. *Annularia longifolia*, Brongt., *Prodrome*, p. 156.
1845. *Annularia longifolia*, Germar, *Vers. v. Wettin u. Löbejun*, p. 25, pl. ix. figs. 1-4.
1852. *Annularia longifolia*, Ettingshausen, *Stenkf. v. Stradonitz*, p. 8, pl. i. fig. 4 (*Abhandl. d. k. k. Geol. Reichs. Wien*, vol. i. Abth. 3, No. 4).
1855. *Annularia longifolia*, Geinitz, *Vers. d. Stenkf. in. Sachsen*, p. 10, pl. xviii. figs. 8-9; pl. xix. figs. 3-5 (? figs. 1-2).
1865. *Annularia longifolia*, Heer, *Urwelt d. Schweiz.*, p. 9, fig. 7.
1869. *Annularia longifolia*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 348, pl. xxvi. figs. 2-4 (? pl. xxii. fig. 5 (*non* figs. 6-10)).
1869. *Annularia longifolia*, Roehl, *Foss. Flora d. Steink.-Form. Westph.*, p. 28, pl. iv. fig. 6 (? fig. 15).
1869. *Annularia longifolia*, Unger, *Anthracit-Lager in Kärnthen.*, p. 783, pl. i. fig. 9 (*Sitzb. d. k. Akad. d. Wissensch. Math. Naturw. cl.*, vol. lx., i. Abth., Wien).
1873. *Annularia longifolia*, Renault, *Ann. d. Sciences Nat.*, 5e sér., *Bot.*, vol. xviii. pp. 14 and 20, pls. xix.-xxiii.
1874. *Annularia longifolia*, Feistmantel, *Vers. d. böhm. Ablag.*, p. 127, pl. xv. figs. 3-4, pl. xvi. fig. 1.
1876. *Annularia longifolia*, Heer, *Flora foss. Helv.*, p. 51, pl. xix. figs. 4-5.
1876. *Annularia longifolia*, Roemer, *Lethæa geog.*, vol. i. p. 150, pl. 1. fig. 8 (? fig. 9).
1878. *Annularia longifolia*, Renault, *Rech. sur la struc. et les affin. botan. d. végét. silicifiés*, p. 31, pls. i.-ii.
1879. *Annularia longifolia*, Lesqx., *Coal Flora*, vol. i. p. 45, pl. ii. figs. 1-2 (? pl. iii. fig. 10, *non* fig. 12).
1880. *Annularia longifolia*, Schimper, in Zittel, *Handbk. d. Palæont.*, ii. Abth., p. 167, p. 166, fig. 126.
1880. *Annularia longifolia*, C. A. White, *State of Indiana 2nd Ann. Rept. Statistics and Geol.*, p. 521, pl. xi. fig. 1 (? fig. 2).
1882. *Annularia longifolia*, Renault, *Cours d. botan. foss.*, vol. ii. p. 126, pl. xx. fig. 1, pl. xxi. figs. 1-6.
1882. *Annularia longifolia*, Weiss, *Aus d. Steink.*, p. 11, pl. ix. fig. 49 (zweiter abdr.).
1883. *Annularia longifolia*, Schenk, in Richthofen's *China*, pp. 231-233, pl. xxxiv. figs. 4, 6, 7, (*non* fig. 5), pl. xxxv. figs. 7, 7a, pl. xxxvi. figs. 1-4, pl. xxxix., pl. xli. fig. 6.
1883. *Annularia longifolia*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part ii., *Palæont.*, p. 44, pl. vii. figs. 1-2.
1899. *Annularia longifolia*, Hofmann and Ryba, *Leitpflanzen*, p. 28, pl. ii. fig. 9.
1886. *Annularia longifolia*, var. *stellata*, Sterzel, *Flora d. Rothl. im Nordw. Sachs.*, p. 58, pl. viii. fig. 3.
1823. *Annularia spinulosa*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 2, p. 36, pl. xix. fig. 4; fasc. 4, p. xxxi.
1826. *Annularia fertilis*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, pp. 47 and xxxi., pl. 51, fig. 2.
1852. *Annularia fertilis*, Bronn, *Lethæa geog.*, vol. i. part 2, p. 105, pl. viii. fig. 8.

1883. *Annularia mucronata*, Schenk, in *Rickthofen's China*, vol. iv. p. 226, fig. 10, pl. xxx. fig. 10.
 1887. *Annularia Geinitzii*, Stur, *Die Calamarien d. Carbon-Flora d. Schatz. Schichten*, pp. 52 and 215, pl. xvi. b figs. 1-3.
 1888. *Annularia Geinitzii*, Toula, *Die Steinkohlen*, p. 204, pl. v. fig. 14.
 1887. *Asterophyllites Westphalicus et Annularia Westphalica*, Stur, *Die Calamarien d. Carbon-Flora d. Schatz. Schichten*, p. 213, pl. xiii. b, fig. 2 (a), pl. iv. b fig. 4.
 1834. *Asterophyllites equisetiformis*, L. and H. (non Schlotheim, sp.), *Fossil Flora*, vol. ii. pl. cxxiv.

Fructification :—

1709. Scheuchzer, *Herb. diluv.*, pl. ii. fig. 6.
 1826. *Bruckmannia tuberculata*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, pp. 45 and xxix., pl. xlv. fig. 2.
 1874. *Bruckmannia tuberculata*, Feistmantel, *Vers. d. böhm. Ablager.*, Abth. i., p. 128 (? pl. xvi. fig. 1) (non pl. xvi. figs. 2-3).
 1877. *Bruckmannia tuberculata*, Grand'Eury, *Flore carbon. d. Départ. de la Loire*, pp. 44-45, pl. vi. fig. 4, 4'.
 1828. *Asterophyllites tuberculata*, Brongt., *Prodrome*, p. 159.
 1876. *Stachannularia tuberculata*, Weiss, *Steinkohlen Calamarien*, Heft i. p. 17, pl. i. figs. 2-5, pl. ii. figs. 1-3, 5 (left-hand figure), pl. iii. figs. 3-10, 12.
 1882. *Stachannularia tuberculata*, Weiss, *Aus d. Steink.*, p. 11, pl. ix. fig. 50 (zweiter abdr.).
 1884. *Calamostachys tuberculata*, Weiss, *Steinkohlen Calamarien*, Heft ii. p. 178.
 1899. *Calamostachys (Stachannularia) tuberculata*, Hofmann and Ryba (*pars*), p. 30, pl. ii. figs. 12-13 (non fig. 14).

Locality B.

Lycopodiaceæ.

Lepidodendron, Sternberg.

Lepidodendron fusiforme, Corda, sp.

(Plate II. figs. 17-18 ; Plate III. figs. 22-25.)

1809. *Phytolithus (cancellatus)*, Martin, *Petrificata Derbiensia*, pl. xiii. fig. 3.
 1818. *Phytolithus cancellatus*, Steinhauer (*pars*), *Trans. Amer. Phil. Soc.*, p. 280, pl. vi. figs. 4-5.
 1822. *Phytolithus cancellatus*, Parkinson, *Outlines of Oryctology*, p. 14, pl. i. fig. 5.
 1845. *Sagenaria fusiformis*, Corda (? *pars*), *Flora d. Vorwelt*, p. 20, pl. vi. fig. 5.
 1875. *Sagenaria fusiformis*, Feistmantel, *Vers. d. böhm. Ablager.*, Abth. ii., p. 38, pl. xix. fig. 2.
 1850. *Lepidodendron fusiforme*, Corda, *Genera et Species*, p. 257.
 1855. *Sagenaria rimosa*, Geinitz (non Sternb.) (*pars*), *Vers. d. Steinkf. in Sachsen*, p. 35, pl. iii. fig. 15.
 1875. *Sagenaria rimosa*, Feistmantel, (non Sternb.) (*pars*), *Vers. d. böhm. Ablager.*, Abth. ii., p. 36, pl. xx. fig. 1.
 1869. *Lepidodendron rimosum*, Roehl (non Sternb.) (*pars*), *Foss. Flora d. Steink.-Form. Westph.*, p. 132, pl. x. fig. 2.
 1899. *Lepidodendron rimosum*, Hofmann and Ryba (non Sternb.) (*pars*), *Leitpflanzen*, p. 81, pl. xv. fig. 4.
 1866. *Lepidodendron simplex*, Lesqx., *Rept. Geol. Survey of Illin.*, vol. ii. p. 454, pl. xlv. fig. 5.

Description.—Leaf cushions touching each other, and sometimes united in spiral series, broadly fusiform, ending in sharp, almost straight points, lateral angles rounded, keel very slight, with occasionally a few transverse notches on its lower portion ; leaf

scar placed very slightly above the centre of the cushion—almost central—and occupying rather more than three-fifths of its width, rhomboidal or diamond-shaped, with upper angle rounded, lower angle sharp, lateral angles rounded or pointed, and from which two lines frequently descend; cicatricules three, punctiform, slightly below the centre of the scar.

Description of Specimens:—

Plate II. fig. 17 is a photograph, natural size, of a plaster of Paris cast from an impression from the “Coal Measures near Halifax, Yorkshire,” in the collection of the Geological Department of the British Museum. An outline of a cushion is given at fig. 18.

This specimen is uncompressed, and the contiguous leaf cushions rise up towards the leaf scar, above which the cushions are rather more raised than below it, as the leaf scar slopes slightly downwards. The lower part of the cushion is slightly keeled with transverse notches, the upper portion of the cushion is smooth, without a keel. The leaf scar is almost central, rounded above and sharply pointed below, with lateral angles which are not very prominent, and from which extend two downward lines. The leaf scar sometimes appears as if very sharp-pointed on its lower margin, but this appearance is partly caused in the uncompressed condition by the central keel rising up to meet the lower angle of the leaf scar. The leaf cushions are straight, or if the points are twisted, the bend is so slight that it is scarcely observable.

My thanks are due to Dr A. SMITH WOODWARD for permission to figure this example.

Plate III. fig. 25 shows a younger condition of the plant from Jockie's Syke, Cumberland, and a portion is enlarged two times at fig. 22, while a leaf cushion and leaf scar are seen at figs. 23 and 24.

The contiguous keeled leaf cushions have straight sides with slightly rounded lateral angles, and about their centre they bear a relatively large rhomboidal leaf scar.

Remarks.—This species, which was first figured by MARTIN in 1809 under the name of *Phytolithus cancellatus*, has been confused with other species of *Lepidodendra*, but especially with *Lepidodendron rimosum*, Sternb., but from *Lepidodendron fusiforme*, *Lepidodendron rimosum* differs in the leaf cushions being distant, more narrowly fusiform, with long tail-like prolongations from the ends of the cushions, which often unite with the neighbouring cushions of the same series; the leaf scar is also smaller in proportion to the width of the cushion, only occupying about one-third of the width, and the interfoliar cortex is ornamented with wavy lines crossed obliquely by fine striæ.

Lepidodendron simplex, Lesqx., appears to me to be referable to *Lepidodendron fusiforme*. His figure shows the leaf cushions united in spiral series, and the same character is seen in the specimen figured by MARTIN.

Lepidodendron fusiforme is not common in Britain, though it extends throughout the whole of the Coal Measures.

Locality B.

Lepidophyllum, Brongniart.

Lepidophyllum, sp.

Locality B.

Stigmaria, Brongniart.

Stigmaria ficoides, Sternberg, sp.

Stigmaria ficoides, Sternb, sp. See *ante*, p. 757.

Locality C.

The vertical distribution of these fossils is seen in the following table.

	U. C. M.	M. C. M.	L. C. M.
Cf. <i>Pecopteris arborescens</i> , Schloth., sp.,	×		
<i>Pecopteris</i> (<i>Cyatheites</i>), sp.,	×		
<i>Alethopteris apiculata</i> , Schl., sp.,	×	×	
„ <i>Grandini</i> , Brongt., sp.,	×	×	
„ <i>Serlii</i> , Brongt., sp.,	×		
<i>Neuropteris ovata</i> , Hoffm.,	×		
„ <i>flexuosa</i> , Sternb.,	×		
„ <i>Schenckzeri</i> , Hoffm.,	×	×	
<i>Calamites</i> (<i>Calamitina</i>) <i>undulatus</i> , Sternb.,	×	×	×
„ (<i>Calamitina</i>), sp.,			
<i>Calamocaulis equisetiformis</i> , Schl., sp.,	×	×	×
<i>Annularia radiata</i> , Brongt. (= <i>Calamites ramosus</i> , Artis),	×	×	×
„ <i>stellata</i> , Schloth., sp.,	×		
<i>Lepidodendron fusiforme</i> , Corda, sp.,		×	×
<i>Lepidophyllum</i> , sp.,			
<i>Stigmaria ficoides</i> , Sternb. sp.,	×	×	×

An analysis of the fossil plants found at Jockie's Syke shows that of the 14 names available for comparison, 13 are already known to occur in the Upper Coal Measures of England, and of these 6 are characteristic of that horizon, 7 are common to Upper and Middle Coal Measures, while 5 occur in the Lower Coal Measures of Britain, but of these 5, 4 are common to all the divisions of the Coal Measures, while the 5th, *Lepidodendron fusiforme*, Corda, sp., has only been previously seen in Britain in the Middle and Lower Coal Measures.

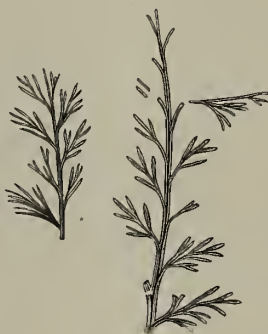
This analysis shows that at least the upper portion of the 'Red Shales' must be classed with the Upper Coal Measures, not only on account of the number of Upper Coal Measure species therein met with, but also on account of the absence of a single characteristic Middle Coal Measure species. This absence of Middle Coal Measure species makes it equally impossible to class these beds with the Upper Transition series.

The fact of *Lepidodendron fusiforme*, Corda, sp., occurring in the Upper Coal

* MARTIN'S specimen probably comes from this horizon.

Measures, which has hitherto only been discovered in the Middle and Lower Coal Measures (where, however, it is extremely rare), does not vitiate the conclusions arrived at in regard to the age of this portion of the Red Shales specially under consideration, but merely shows that *Lepidodendron fusiforme* is one of those species which extends throughout the whole of the Coal Measures, as several of the *Lepidodendra* do. It is also the only plant discovered at Jockie's Syke which had not previously been found in the Upper Coal Measures of other areas.

THE FOSSIL PLANTS FROM THAT PORTION OF THE CARBONIFEROUS LIMESTONE SERIES OF NORTHUMBERLAND AND CUMBERLAND, WHICH IS THE GEOLOGICAL EQUIVALENT OF A PORTION OF THE CALCIFEROUS SANDSTONE SERIES OF SCOTLAND.



Rhodea moravica, Ett., sp.

The great majority of the specimens on which the following list is founded were collected by Mr JOHN RHODES, Fossil Collector to the Geological Survey of England. A few additional specimens were also collected by the late Mr HUGH MILLER while surveying in the district under consideration, and by Mr A. MACCONOCHIE of the Scotch Geological Survey. A list of the plants contained in these collections was prepared in 1886, but was laid aside at the time. It is now published, with a few additions, with the double object of recording the fossil plants which occur in the Calciferous Sandstone series of the North of England, and also for the purpose of comparing them with those from the Calciferous Sandstone series of Dumfriesshire.

The relative positions of the geological horizons mentioned are shown in the following table of classification, supplied by Mr C. T. CLOUGH, in which the highest horizon is placed at the top.

Calcareous Division.

Scremerston, or Carbonaceous Division.

Fell Sandstones.

Cementstone Series (= Ballagan Series) and Rothbury Limestones.

All these groups certainly belong to the Calciferous Sandstone Series of Scotland.

List of Fossil Plants.

Algæ.

Bythotrephis, Hall.

Bythotrephis acicularis, Göppert, sp.

Bythotrephis acicularis, Goppert, sp., see *ante*, p. 743.

Locality.—Lumby Law railway cutting, quarter mile north of Edlingham church, Northumberland.

Horizon.—Cementstone and Rothbury Limestone series. (Algæ limestone on thick sandstone, middle of cutting.)

Bythotrephis plumosa, Kidston, sp.

Bythotrephis plumosa, Kidston, sp. See *ante*, p. 743.

Locality.—Bull Cleuch, Kirk Beck, Bewcastle, Cumberland.

Horizon.—Calciferous Sandstone series, near base of Fell Sandstones.

Bythotrephis gracilis, Hall.

Bythotrephis gracilis, Hall. See *ante*, p. 743.

Remarks.—The specimen from White Line is preserved as an ochreous stain on an impure limestone. The form of the plant is that which HALL distinguishes as var. *crassa*.

Locality.—White Line, near Low House, Cumberland.

Horizon.—Low down in the Calciferous Sandstone series.

Filicaceæ.

Sphenopterideæ.

Calymmatotheca, Stur.

Calymmatotheca affinis, L. and H., sp.

1832. *Sphenopteris affinis*, L. and H., *Fossil Flora*, vol. i. pl. xlv.

1836. *Sphenopteris affinis*, Hibbert, *Trans. Roy. Soc. Edin.*, vol. xiii. p. 178 pl. vi. fig. 4, pl. v. *bis*.

TRANS. ROY. SOC. EDIN., VOL. XL. PART IV. (NO. 31).

1876. *Sphenopteris affinis*, Peach, *Trans. Bot. Soc. Edin.*, vol. xii. pp. 162, 187.
 1877. *Sphenopteris affinis*, Peach, *Quart. Journ. Geol. Soc.*, vol. xxxiv. p. 132, pl. vii., pl. viii. figs. 5-7.
 1879. *Sphenopteris affinis*, Schimper, in *Zittel, Handb. d. Palæont.*, ii. Abth., *Palæophytologie*, p. 106, fig. 74.
 1886. *Calymmatotheca affinis*, Kidston, *Catal. palæoz. plants in Brit. Mus.*, p. 66.
 1887. *Calymmatotheca affinis*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 145, pl. ix. figs. 18-22.
 1901. *Calymmatotheca affinis*, Vaffier, *Étude géol. et paléont. du Carbon inférieur du Maconnais*, p. 102, pl. i. figs. 1, 1a. (Ann. de l'Université de Lyon, Nouv. Sér., i. Sciences, Médecine, fasc. 7.)
 1829. *Sphenopteris linearis*, Brongt. (non Sternberg), *Hist. d. végét. foss.*, p. 175, pl. liv. fig. 1.
 1836. *Sphenopteris linearis*, Hibbert, *Trans. Roy. Soc. Edin.*, vol. xiii. p. 178, pl. vi. fig. 3.
 1836. *Cheilanthis linearis*, Göpp., *Syst. fil. foss.*, p. 232 (excl. ref. Sternberg).
 1877. *Staphylopteris? Peachii*, Peach, *Quart. Journ. Geol. Soc.*, vol. xxxiv. p. 131, pl. viii. figs. 1-3 (? fig. 4).
 1877. *Diplothmema affine*, Stur, *Culm Flora*, Heft ii. p. 230.

Remarks.—I was formerly under the opinion that some of the specimens of *Sphenopteris flexilis* and *Sphenopteris frigida*, as figured by HEER,* were referable to *Calymmatotheca affinis*, L. and H., sp.,† but NATHORST, who has carefully refigured this species, has shown that I was mistaken in this view.‡

The only record, therefore, for this species outside of Britain appears to be that by Dr VAFFIER, who has discovered *Calymmatotheca affinis*, L. and H., sp., in the Culm of Fuissé, Canton of Mâcon, France.

A very good restoration of *Calymmatotheca affinis* is given by HUGH MILLER as the frontispiece to his *Testimony of the Rocks* (edition 1857).

Locality.—Bull Cleuch, Kirkburn; Bewcastle, Cumberland.

Horizon.—Cementstone series.

Locality.—Warksburn, above the sun-cracked (?) calc grit.

Horizon.—In upper part of Calciferous Sandstone series—below base of Yoredales.

Calymmatotheca bifida, L. and H., sp.

Calymmatotheca bifida, L. and H., sp. See *ante*, p. 745.

Locality.—Shore section, Sandstone quarry, a little south of Sea Houses, near North Sunderland, Northumberland.

Horizon.—Calcareous Group,—rather above the Middle, *i.e.* about 50 feet below the Eelwell Limestone—Uppermost beds of Calciferous Sandstone series.

Locality.—Craneclough Burn, opposite Craneclough new houses, Whickhope Burn, North Tynedale, Northumberland.

Horizon.—Top of Fell Sandstones—(no line drawn here between Fell Sandstones and Carbonaceous group = bottom of Scremerston group.

* *Beitr. z. foss. Flora Spitzbergens*, Kongl. Svenska Vetenskaps Akad. Handl., Band 14, No. 5, 1876.

† *Catal. Palæoz. Plants*, p. 67; also *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 145.

‡ *Foss. Flora d. Polarländer*, Erst. Theil, Erst. Lief., Kongl. Svenska Vetenskaps Akad., Band 26, No. 4, 1894.

Locality.—River Irthing, seven-eighth mile N. of Lampert, county boundary between Northumberland and Cumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—Bateinghope Burn, one mile from head of stream, Redesdale, Northumberland.

Horizon.—Cementstone series.

Locality.—Rigend Burn, Keilder, Northumberland.

Horizon.—Lower Limestone series. Carbonaceous group = Scremerston group.

Locality.—Foot of Sauchie Syke, Little Whickhope Burn, North Tynedale, Northumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—East bank of Lewis Burn, Barney's Cut, a little over quarter mile S.W. of Lewis Burn Bridge, North Tynedale, Northumberland.

Horizon.—Carbonaceous group, in Lewis Burn Coal series = Scremerston group.

Locality.—Lewis Burn, over 200 yards below Lewis Burn Colliery, North Tynedale, Northumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—Plashetts Burn, North Tyne, Northumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—Buck Burn, three-quarter mile N.W. of Willow Bog, Oakenshaw Burn, North Tynedale, Northumberland.

Horizon.—Upper part of Fell Sandstone group.

Locality.—River Irthing, one mile due north of Lampert.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—Bothrigg Burn, near the head, one mile E. of Flat, Bewcastle, Cumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—River Irthing, two miles N.E. of Waterhead, Cumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—Whintingstone Burn, Black Line, Cumberland.

Horizon.—Lower Limestone series (Cementstone series?).

Locality.—Whintingstone Burn, Clattering Ford, Bewcastle, Cumberland.

Horizon.—Lower Limestone series (Cementstone series?).

Locality.—River Irthing, three-quarter mile E. of Waterhead, Cumberland.

Horizon.—Carbonaceous group = Scremerston group.

Locality.—Foot of streamlet, one mile S.E. of Wileysike, river Irthing, Cumberland.

Horizon.—Carbonaceous group = Scremerston group.

Sphenopteris, Brongniart.

Sphenopteris elegans, Brongt.

1720. *Fumaria officinalis*, Siles. *Subterr.*, p. 111, pl. xiv. fig. 2.
 1804. Schlotheim, *Flora d. Vorwelt*, p. 49, pl. x. fig. 13 (*pars*).
 1820. *Filicites adiantoides*, Schlotheim, *Petrefactenkunde*, p. 408, pl. xxi. fig. 2 (*pars*).
 1820. *Farrnkraut*, Rhode, *Beitr. z. Pflanzenkunde d. Vorwelt*, p. 33, pl. viii. figs. 7-10.
 1822. *Filicites (Sphenopteris) elegans*, Brongt., *Class. d. végét. foss.*, p. 33, pl. ii. figs. 2a, 2b.
 1823. Sternberg, *Essai flore monde prim.*, vol. i. fasc. 2, p. 33, pl. xxiii. figs. 2a, 2b.
 1826. *Sphenopteris elegans*, Sternb., *Essai flore monde prim.*, fasc. iv. p. 15, pl. xxiii. figs. 2a, 2b; vol. ii. fasc. v.-vi. p. 56 (*non* pl. xx. figs. 3-4*).
 1828. *Sphenopteris elegans*, Brongt., *Prodrome*, p. 50.
 1830. *Sphenopteris elegans*, Brongt., *Hist. d. végét. foss.*, p. 172, pl. liii. figs. 1-2.
 1848. *Sphenopteris elegans*, Sauveur, *Végét. foss. de la Belgique*, pl. xvi. figs. 1-2.
 1882. *Sphenopteris elegans*, Weiss, *Aus d. Steink.*, p. 13, pl. xi. fig. 71 (zweiter abdr.).
 1899. *Sphenopteris elegans*, Hofmann and Ryba, *Leitpflanz.*, p. 38, pl. iii. figs. 18-20 (*non* fig. 17).
 1899. *Sphenopteris elegans*, Frech, *Lethæa geog.*, vol. ii. Lief. 2, pl. xxxvii. a fig. 2.
 1899. *Sphenopteris elegans*, Potonié, *Lehrb. d. Pflanzenpal.*, p. 137, fig. 128.
 1836. *Cheilanthes elegans*, Göpp., *Syst. fil. foss.*, p. 233, pl. x. fig. 1, pl. xi. figs. 1-2.
 1877. *Diplothmema elegans*, Stur, *Culm Flora*, Heft ii. p. 236, pl. xxx. fig. 5, pl. xxxi. figs. 1-6.
 1899. *Diplothmema elegans*, Zeiller, *Mém. Soc. géol. d. France. Paléont.*, No. 21, *Flore foss. bassin houil. d'Héracle*, p. 30, pl. iii. figs. 3-4.
 1852. *Sphenopteris officinalis*, Giebel, *Deutschl. Petrefacten.*, p. 39.
 1853. *Sphenopteris Johnstoniana*, Tate, in *Johnston, Nat. Hist. of Eastern Borders*, vol. i., *Botany*, p. 306, figs. 1-2.

Locality.—Budle, Northumberland ("In shale," Tate).

Horizon.—Top of Calciferous Sandstone series = Oil Shale group of Midlothian.

Locality.—Northern branch of Caller Cleuch, $\frac{5}{8}$ mile E. of Kielder Head, Northumberland.

Horizon.—Cementstone series.

Sphenopteris decomposita, Kidston.

Sphenopteris decomposita, Kidston. See *ante*, p. 747.

Locality.—Yate Burn, two miles S.S.W. of High Long House, Northumberland.

Horizon.—Calciferous Sandstone series (? Fell Sandstones).

Sphenopteris Dicksonioides, Göppert, sp.

1836. *Aspidites Dicksonioides*, Göpp., *Syst. fil. foss.*, p. 361, pl. xxviii.
 1869. *Pecopteris Dicksonioides*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 521.
 1877. *Diplothmema Dicksonioides*, Stur, *Culm Flora*, Heft ii. p. 248, pl. xxxiii. figs. 1-5.
 1882. *Sphenopteris Dicksonioides*, Weiss, *Aus d. Steink.*, p. 12, pl. xi. figs. 65-66 (zweiter abdr.).

* The plant figured here appears to be the *Sphenopteris divaricata*, Göpp., sp.

1883. *Sphenopteris Dicksonioides*, Kidston, *Trans. Edin. Geol. Soc.*, vol. iv. p. 333.

1899. *Sphenopteris Dicksonioides*, Zeiller, *Mém. Soc. géol. d. France. Paléont.*, No. 21 (*Flore foss. d. bassin houil. d'Héracleé*), p. 6, pl. i. fig. 2.

Locality.—Shore section, W. of Budle, Chesterfield Slakes, Northumberland.

Horizon.—Calcareous group—about the middle—top of Calciferous Sandstone series = Oil Shale group of Midlothian.

Sphenopteris, sp.

(Plate II. fig. 16.)

Note.—Allied to *Sphenopteris foliolata*, Stur.*

Locality.—Shore section, W. of Budle, Chesterfield Slakes, Northumberland.

Horizon.—Calcareous group, about the middle—top of Calciferous Sandstone series = Oil Shale group of Midlothian.

Rhodea, Presl.

Rhodea moravica, Ettingshausen, sp.

(Woodcut, p. 812.)

1865. *Trichomanes moravicum*, Ett., *Foss. Flora d. Mähr.-Schles. Dachschiefers*, p. 24, fig. 9, pl. vi. fig. 4.

1869. *Sphenopteris* (*Trichom.*) *moravica*, Schimper, *Traité d. paléont. végét.*, vol. i. p. 414.

1875. *Rhodea moravica*, Stur, *Culm Flora*, Heft i. p. 38, pl. x. figs. 3-7, pl. xi. fig. 1.

1891. *Rhodea moravica*, Vaffier, *Étude géol. et paléont. du Carbon inférieur du Maconnais*, p. 109, pl. iii. figs. 2, 2a, 2b, 2c, 2d.

1877. *Calymmothea moravica*, Stur, *Culm Flora*, Heft ii. p. 278.

Remarks.—A few fragments of *Rhodea moravica*, Ett., sp., were collected at Budle. The type specimens, as figured by ETTINGSHAUSEN, have suffered much from decay before fossilisation took place, hence his figures show little more than the veins of the pinnules, from which all the limb has decayed.

STUR, in his *Culm Flora*, more fully figures and describes the species. The pinnules are divided into 3-10 simple or bifid linear segments, each having a central vein. The limb of the pinnule forms a very narrow border to the veins. Though the Budle specimens are fragmentary, they show very well the form and segmentation of the pinnules.

Locality.—Shore section, W. of Budle, Chesterfield Slakes, Northumberland.

Horizon.—Calcareous group, about the middle—top of Calciferous Sandstone series = Oil Shale group of Midlothian.

* *Culm Flora*, Heft i. p. 22, pl. v. figs. 3-6, 1875.

Rhodea dissecta, Brongt., sp.

1839. *Sphenopteris dissecta*, Brongt., *Hist. d. végét. foss.*, p. 183, pl. xlix. figs. 2-3.
 1877. *Diplothmema dissectum*, Stur, *Culm Flora*, Heft ii. p. 230.
 1899. *Diplothmema dissectum*, Zeiller, *Étude sur la flore foss. du bassin houil. d'Héraclée*, p. 30, pl. iii. fig. 2.
 1900. *Diplothmema dissectum*, Zeiller, *Éléments d. paléobotanique*, p. 87, fig. 58.
 1899. *Rhodea dissecta*, Potonié, *Lehrb. d. Pflanzenpalæont.*, p. 135, fig. 125.
 1899. *Rhodea dissecta*, Frech, *Lethæa geog.*, i. Theil, *Lethæa palæoz.*, 2 Band, 2 Lief., *Die Steinkohlenform.*, pl. xxxvii. b fig. 5, and explanation to figure.
 1877. *Diplothmema Schützei*, Stur, *Culm Flora*, Heft ii. p. 234, pl. xxx. figs. 4 a, b, c, d, e, f.
 1888. *Diplothmema Schützei*, Toulà, *Die Steinkohlen*, p. 187, pl. i. fig. 10.

Locality.—Shore at Pit open water-level, Spittal, Tweedmouth, Northumberland.

Horizon.—Carbonaceous group = Scremerston group.

Rhodea patentissima, Ettingshausen, sp.

1865. *Hymenophyllites patentissima*, Ett., *Foss. Flora d. Mähr.-Schles. Dachschiefers*, p. 26, fig. 13, pl. vii. fig. 4.
 1869. *Sphenopteris* (*Hymen.*) *patentissima*, Schimper, *Traité d. paléont. végét.*, vol i. p. 407.
 1900. (?) *Sphenopteris patentissima*, White, *Stratigraphic Succession of the Fossil Floras of the Pottsville Formation in the Southern Anthracite Coal Field, Pennsylvania* (20th Ann. Rept. U.S. Geol. Survey, part ii., *Geol. and Palæont.*), p. 880, pl. clxxxviii. fig. 1.
 1875. *Rhodea patentissima*, Stur, *Culm Flora*, Heft 1, p. 36, pl. ix. figs. 1-9.

Note.—Only a single specimen has been met with, and, though small, is sufficiently well preserved to permit of a satisfactory determination.

Locality.—Kirk Beck, White Line, Bewcastle, Cumberland.

Horizon.—Cementstone series.

Rhacopteris, Schimper.*Rhacopteris flabellata*, Tate, sp.

1853. *Sphenopteris flabellata*, Tate, in Johnston, *Nat. Hist. of the Eastern Borders*, vol. i., *Botany*, p. 308, fig. 3.
 1886. *Rhacopteris flabellata*, Kidston, *Catal. Palæoz. Plants Brit. Mus.*, p. 63.
 1889. *Rhacopteris flabellata*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxv. p. 442, pl. i. fig. 2, pl. ii. figs. 4-6 (? fig. 7).
 1865. *Noeggerathia*, sp., Gomes, *Flora foss. do terr. carbon. das visin. do Porto, Serra do Bussaco, etc.*, p. 32, pl. ii. figs. 1-2 (*Commissãs geol. de Portugal*).

Locality.—Budle, Northumberland ("In shale," Tate).

Horizon.—Top of Calciferous Sandstone series = Oil Shale group of Midlothian.

Rhacopteris subcuneata, Kidston.

1894. *Rhacopteris subcuneata*, Kidston, *Proc. Roy. Phys. Soc. Edin.*, vol. xii. p. 261, pl. v. fig. 2, pl. vi. fig. 1.

Locality.—East bank of Lewis Burn, Barney's Cut, a little over quarter mile S.W. of Lewis Burn Bridge, North Tynedale, Northumberland.

Horizon.—Lewis Burn Coal group—low down in Carbonaceous group = Scremerston group.

Adiantites, Göppert.

Adiantites antiquus, Ettingshausen, sp.

1865. *Adiantum antiquum*, Ett., *Foss. Flora d. Mährisch-Schlesischen Dachschiefers*, p. 22, fig. 7, pl. vii. fig. 1.

1875. *Adiantides antiquus*, Stur, *Culm Flora*, Heft i. p. 66, pl. xvi. figs. 4–6, pl. xvii. figs. 3–4.

1889. *Adiantides antiquus*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxv. p. 421, pl. i. fig. 1.

Locality.—Spithope Burn, Rede Water, Northumberland.

Horizon.—Cementstone series.

Neuropterideæ.

Cardiopteris, Schimper.

Cardiopteris polymorpha, Göpp., sp.

Cardiopteris polymorpha, Göpp., sp. See *ante*, p. 749.

Locality.—Pit heaps, quarter mile N.E. of Chalton Lime Works.

Horizon.—Calcareous series. Coal above Woodend Limestone. Upper part of the Calciferous Sandstone series = Oil Shale group of Midlothian.

Locality.—Warksburn, North Tynedale, Northumberland.

Horizon.—Calciferous Sandstone series. Lower part of Midlothian Oil Shale group = Scremerston series.

Alcicornopterideæ.

Alcicornopteris, Kidston.

Alcicornopteris convoluta, Kidston.

Alcicornopteris convoluta, Kidston, see *ante*, p. 749.

Locality.—River Tweed, 100 yards below Norham Castle, Northumberland.

Horizon.—Cementstone series.

Locality.—Horncliff Dean, near Mill, river Tweed, S. of Horncliff village, Northumberland.

Horizon.—Cementstone series, upper part, a few hundred feet below Fell Sandstones.

Locality.—River Coquet, half mile N.N.E. of Holystone, Northumberland.

Horizon.—Cementstone series.

Locality.—Spithope Burn, Rede Water, Northumberland.

Horizon.—Cementstone series.

Locality.—Hawkburn, near Catcleuch, Redesdale, Northumberland.

Horizon.—Cementstone series.

Locality.—Crawley Dean, one-third mile S. of Powburn, near Ingram, Northumberland.

Horizon.—Cementstone series.

Locality.—Coombsdon Burn, half mile S.W. from its junction with the river Rede, Northumberland.

Horizon.—Cementstone series.

Locality.—Bull Cleuch, Bewcastle, Cumberland.

Horizon.—Cementstone series.

Fern Stem.

Eskdalia, Kidston.

Eskdalia minuta, Kidston, sp.

Eskdalia minuta, Kidston, see *ante*, p. 750.

Locality.—River Coquet, half mile N.N.E. of Holystone, Northumberland.

Horizon.—Cementstone series.

Equisetaceæ.

Asterocalamites, Schimper.

Asterocalamites scrobiculatus, Schlotheim, sp., p. 751.

Locality.—Yate Burn, two miles S.S.W. of High Long House, Northumberland.

Horizon.—Upper part of Calcareous Sandstone series = Oil Shale group of Midlothian.

Locality.—Sandstone quarry, east of Long Crag.

Horizon.—(?)

Lycopodiaceæ.

Lepidodendron, Sternberg.

Lepidodendron Veltheimii, Sternberg.

Lepidodendron Veltheimii, Sternb., see *ante*, p. 754.

Locality.—Yate Burn, two miles S.S.W. of High Long House, Northumberland.

Horizon.—Upper part of Calciferous Sandstone series=Oil Shale group of Midlothian.

Locality.—Chattlehope Burn, two miles S.W. of Chattlehope House, Rede Water, Northumberland.

Horizon.—Cementstone series.

Lepidodendron Volkmannianum, Sternberg.

(Plate II. fig. 19.)

1820. "*Schuppenpflanze*," Rhode, *Beitr. z. Pflanzenkunde d. Vorwelt*, p. 32, pl. vii. figs. 4–5.
 1826. *Lepidodendron Volkmannianum*, Sternb., *Essai flore monde prim.*, vol. i. fasc. 4, p. 10, pl. liii. figs. 3a, 3b, 3c.
 1877. *Lepidodendron Volkmannianum*, Stur, *Culm Flora*, Heft ii. p. 392, pl. xxxv. fig. 4, pl. xl. figs. 2, 3 (fig. 4 ?) (non fig. 5).
 1882. *Lepidodendron Volkmannianum*, Weiss, *Aus d. Steink.*, p. 8, pl. iv. fig. 29 (zweiter abdr.).
 1899. *Lepidodendron Volkmannianum*, Frech, *Lethæa geog.*, 1 Theil, *Lethæa Palæoz.*, Band ii. Lief. ii., *Die Steinkohlenform.*, pl. xxxvii. a figs. 1a, 1b.
 1899. *Lepidodendron Volkmannianum*, Hofmann and Ryba, *Leitpflanzen*, p. 81, pl. xv. figs. 2, 3.
 1901. *Lepidodendron Volkmannianum*, Potonié, *Silur- und Culm-Flora d. Harzes u. d. Magdeburgischen*, p. 113, figs. 68–71 (*Abhandl. d. k. preuss. geol. Landesanstalt, Neue Folge*, Heft 36).
 1838. *Sagenaria Volkmanniana*, Presl, in Sternb., *Essai flore monde prim.*, vol. ii. pl. 179, p. lxviii. fig. 8.
 1854. *Sagenaria Volkmanniana*, Göpp., in Roemer, *Beitr. z. Kenntn. d. Nordwest. Harzgebirges. Palæont.*, vol. iii. p. 46, pl. vii. fig. 15.
 1838. *Sagenaria affinis*, Presl, in Sternberg, *Essai flore monde prim.*, vol. ii. p. 180, pl. lxviii. fig. 9.
 1852. *Sagenaria Roemeriana*, Göpp., *Foss. Flora d. Ubergangs*, p. 184.
 1862. *Sagenaria concinna*, Roemer, *Palæont.*, vol. ix. p. 10, pl. iv. fig. 8.

Remarks.—The specimen figured here is the only example I have seen from England, and represents that form of the plant to which PRESL gave the name of *Sagenaria affinis*. *Lepidodendron Volkmannianum*, Sternb., is very rare in Britain.

Locality.—Quarry, one mile S.W. of Glorum farm-house, Bamborough, Northumberland.

Horizon.—Upper part of Calciferous Sandstone series=Oil Shale group of Midlothian.

Lepidodendron Harcourtii, Witham.

1832. *Lepidodendron Harcourtii*, Witham, "On the *Lepidodendron Harcourtii*," *Trans. Nat. Hist. Soc. of Northumberland, Durham, and Newcastle-on-Tyne*, vol. ii. p. 236, pl. v. figs. 1–7, pl. vi. figs. 1–7, 1838.
 1833. *Lepidodendron Harcourtii*, Witham, *Internal Structure of Fossil Vegetables*, pp. 51, 75, pl. xii. figs. 1–7, pl. xiii. figs. 1–7.
 1833. *Lepidodendron Harcourtii*, L. and H., *Fossil Flora*, vol. ii. pl. xcviii., pl. xcix.
 1839. *Lepidodendron Harcourtii*, Brongt., "Observ. sur la Struct. intér. du *Sigillaria elegans* comparée à celle des *Lepidodendron* et des *Stigmaria*," *Archives d. Mus. d'hist. nat. (Paris)*, vol. i. p. 417 et seq., pl. xxx. and pl. xxxi.

Remarks.—It has been believed that the museum of the Yorkshire Philosophical Society, York, possessed the original specimen from which the sections had been prepared that are described and figured by LINDLEY and HUTTON in their *Fossil Flora*.*

Through the kindness of the Curator, Mr H. M. PLATNAUER, I had an opportunity of examining the reputed types of LINDLEY and HUTTON's descriptions and figures in the York museum. The material consists of part of a stem showing structure and a microscopical section. On comparing the stem with the section, it was evident, owing to the larger size of the latter and its different character of preservation, that it had not formed part of the supposed LINDLEY and HUTTON stem. On this being pointed out, with the object of arriving at a definite conclusion as to the stem being LINDLEY and HUTTON's type, Mr PLATNAUER obtained permission from the Council of the museum for having the stem sliced. This has been done, and it now transpires that the stem is the original block from which BRONGNIART's transverse section, was derived. Apparently BRONGNIART possessed little more than a transverse section, as most of the longitudinal sections he publishes are copies of WITHAM's and LINDLEY and HUTTON's figures.

The transverse section to which I have already referred, and on the glass of which is written with a diamond "Northumberland Limestone, Vernon," is the transverse section figured by WITHAM in the *Trans. Nat. Hist. Soc. of Northumberland, Durham, and Newcastle-on-Tyne*, plate ii. fig. 1, and in his *Fossil Vegetables*, pl. xiii. fig. 1. With these conclusions in regard to the identifications of these two specimens, Dr D. H. SCOTT, to whom I showed the specimen and sections, fully agrees.

On the other hand, I cannot identify either of these with the figures of *Lepidodendron Harcourtii* given by LINDLEY and HUTTON. The specimen from which their sections came may have been all cut up at the time; but if not, it seems to be lost or buried in some collection, where it is unrecognised as LINDLEY and HUTTON's type. Several examples, however, seem to have been found, for LINDLEY and HUTTON say, "the *fossils* are found partly in the coal and partly in the roof, which in some cases consists of a mass of encrinal remains and shells, such as *Productæ*, *Melaniæ*, etc."†

The type specimens of *Lepidodendron Harcourtii* came from Hesley Heath, near Rothbury, Northumberland, from rocks belonging to the Scremerston group of the Calciferous Sandstone series, but the late Prof. WILLIAMSON, in part xix. of his *Memoirs* "On the organisation of the Fossil Plants of the Coal Measures,"‡ describes a *Lepidodendron* from the Lower Coal Measures which he identifies as *Lepidodendron Harcourtii* of WITHAM. It is, however, a well ascertained fact that not a single species of *Lepidodendron* which occurs in the Lower Carboniferous has ever been known to pass into the Upper Carboniferous; it is therefore most improbable that the plant identified by WILLIAMSON as WITHAM's species can really be that plant, notwithstanding the great similarity of stem structure. It is perhaps to be expected that plants so closely related, though undoubtedly specifically distinct, as the Upper and Lower Carboniferous

* WILLIAMSON, *Proc. Roy. Soc. London*, vol. xlii. p. 6.

† LINDLEY and HUTTON, *l.c.*, vol. ii. p. 45.

‡ *Phil. Trans.*, 1893, B, p. 1. See also *Proc. Roy. Soc. London*, vol. xlii p. 6, 1886.

Lepidodendra may possess an internal structure so similar that at present we are unable to distinguish any specific difference in their structure. It is, however, much to be desired that fresh material might be procured from the original *Horizon* of WITHAM's *Lepidodendron Harcourtii*, so that a careful structural comparison might be made between the *Lepidodendron Harcourtii*, Witham, and that described by WILLIAMSON under the same name, and so to ascertain if there are not some anatomical differences.

It has been thought by some botanists that *Lepidodendron Harcourtii* should, on account of the 'corona' which surrounds the outer margin of the vascular axis, be classed with the *Lepidophloios*, as in *Lepidophloios* stems which have shown structure this 'corona' seems to be always present.

Locality.—Hesley Heath, near Rothbury, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Bothrodendron, L. and H.

Bothrodendron Kidstoni, Weiss.

1889. *Bothrodendron Wülkianum*, Kidston (*pars*), *Ann. and Mag. Nat. Hist.*, ser. 6, vol. iv. p. 65, pl. iv. fig. 2.

1889. *Bothrodendron Wülkianum*, Kidston (*pars*), *Proc. Roy. Phys. Soc. Edin.*, vol. x. p. 94, pl. iv. fig. 2.

1893. *Sigillaria (Bothrodendron) Kidstoni*, Weiss, *Die Sigillarien d. preuss. Steink. u. Rothl. Gebiete*, ii. Gruppe. *Die Subsigillarien*, p. 56, pl. xxviii. fig. 110 (*Abhandl. d. Königl. preuss. geol. Landesanstalt, Neue Folge*, Heft 2).

Remarks.—The specimen which WEISS names *Bothrodendron Kidstoni* I previously included with *Bothrodendron Wülkianum*, regarding it as possibly a younger condition of that species.

It differs from *Bothrodendron Wülkianum* in possessing a smooth bark and closer leaf scars, from which two lateral lines extend downwards. I now believe I was in error in regarding this specimen as a young condition of *Bothrodendron Wülkianum*.

The type specimen of *Bothrodendron Kidstoni*, Weiss, was received from the late Mr HUGH MILLER.

Locality.—Little Whickhope Burn, near first branch above Cross Syke, Northumberland.

Horizon.—Well down in the Calciferous Sandstone series—Cementstone series or Fell Sandstone series.

Lepidophyllum, Brongniart.

Lepidophyllum lanceolatum, L. and H.

Lepidophyllum lanceolatum, L. and H. See *ante*, p. 756.

Locality.—Yate Burn, two miles S.S.W. of High Long House, Northumberland.

Horizon.—Calciferous Sandstone series = Oil Shale group of Midlothian.

Locality.—Gummerston Coal Pit, North Tynedale, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Lepidostrobus, Brongniart.

Lepidostrobus variabilis, L. and H.

Lepidostrobus variabilis, L. and H. See *ante*, p. 756.

Locality.—East bank of Lewis Burn, Barney's Cut, a little over quarter mile S.W. of Lewis Burn Bridge, North Tynedale, Northumberland.

Horizon.—Carbonaceous series—Lewis Burn Coal group.

Lepidostrobus fimbriatus, Kidston.

Lepidostrobus fimbriatus, Kidston. See *ante*, p. 756.

Locality.—Black Cleuch, tributary of Chirdon Burn, above Tarsset, Northumberland.

Horizon.—Well up in the Calciferous Sandstone series = Scremerston group.

Locality.—River Irthing, five-eighth mile S. of Lampert boundary line between Northumberland and Cumberland.

Horizon.—Carbonaceous series = Scremerston group.

Locality.—Near foot of Bailey Water, Cumberland.

Horizon.—Cementstone series.

Locality.—Black Line, Clattering Ford, Cumberland.

Horizon.—Scremerston group (?).

Locality.—Trout Beck, below King Water, Cumberland.

Horizon.—Near base of Fell Sandstones.

Locality.—King Water, half mile above foot of Trout Beck, Cumberland.

Horizon.—Near base of Fell Sandstones.

Locality.—King Water, half mile S. of Spottey Bank, Cumberland.

Horizon.—Near base of Fell Sandstones.

Locality.—Tributary of Kershope Burn, one mile E. of Kershope Foot, Cumberland.

Horizon.—Scremerston group.

Locality.—Kershope Head, Cumberland.

Horizon.—Scremerston group.

Locality.—River Irthing, three-quarter mile E. of Waterhead, Cumberland.

Horizon.—Carbonaceous series = Scremerston group.

Locality.—Lewis Burn, about 100 yards above the Old Lewis Burn bridge, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Locality.—Lewis Burn, half mile N.W. of bridge, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Locality.—Lewis Burn, about 200 yards below Lewis Burn Colliery, North Tynedale, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Locality.—Lewis Burn, a little over 100 yards below Lewis Burn Colliery, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Stigmaria, Brongniart.

Stigmaria ficoides, Sternberg, sp.

Stigmaria ficoides, Sternberg, sp. See *ante*, p. 757.

Locality.—Open coal working near Hawkhope coal working, one and a half miles N.E. of Falstone church, Northumberland.

Horizon.—Scremerston group.

Locality.—Lishaw Burn, Yate Burn, five-eighth mile S. of High Long House, Northumberland.

Horizon.—Scremerston group.

Locality.—Shore section, W. of Budle, Chesterfield Slakes, Northumberland.

Horizon.—Upper part of Calciferous Sandstone series = Oil Shale group of Midlothian.

Locality.—Lewis Burn, over 200 yards below Lewis Burn Colliery, North Tynedale, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Locality.—Buck Burn, three-quarter mile N.W. of Willow Bog, Oakenshaw Burn, North Tynedale, Northumberland.

Horizon.—Upper part of Fell Sandstone group.

Stigmaria ficoides, var. undulata, Göpp.

1841. *Stigmaria ficoides*, var. *undulata*, Göpp., *Gatt. d. foss. Pflanzen.*, Lief. 1–2, pp. 13, 30, pl. ix. figs. 5–8 (! fig. 9).

1852. *Stigmaria ficoides*, var. *undulata*, Göpp., *Foss. Flora d. Übergangs*, p. 245, pl. xxxii. fig. 2.

1884. *Stigmaria ficoides*, var. *undulata*, Lesqx., *Indiana Dept. of Geol. and Nat. Hist. 13th Ann. Rept.*, part ii., *Palæont.*, p. 96, pl. xix. fig. 3.

1873. *Stigmaria ficoides*, Feistmantel, *Zeitsch. d. dent. geol. Gesell.*, vol. xxv. pp. 535, 540, pl. xvii. fig. 37.

1865. *Stigmaria*, with scars in rhomboidal areoles, Dawson, *Quart. Journ. Geol. Soc.*, vol. xxii. p. 169, pl. xii. fig. 83.

Locality.—Found lying loose, not far from Ox Crag, top of Bewcastle Fells, Northumberland (H. MILLER).

Horizon.—(?) Boulders here have travelled from many miles to the west.

Cordaiteæ.

Samaropsis, Göppert.

Samaropsis nervosa, Kidston, sp.

1894. *Cardiocarpus nervosus*, Kidston, *Proc. Roy. Phys. Soc.*, vol. xii. p. 266, pl. v. figs. 3-5.

Locality.—Horncliff Dean, near mill, River Tweed, S. of Horncliff village, Northumberland.

Horizon.—Cementstone series = Ballagan group.

Locality.—River Coquet, half mile N.N.E. of Holystone, Northumberland.

Horizon.—Cementstone series = Ballagan group.

Rhabdocarpus, Göppert and Berger.

Rhabdocarpus curvatus, Kidston, n.sp.

(Plate II. fig. 14 *a*, *b*, *c*, *d*.)

Seeds oblong, blunt at both extremities, slightly curved, and bearing about eight slight ridges on the exposed surface.

Remarks.—All the specimens figured occur on the same block,—*a*, *b*, *c* all shown in their relative position as they occur on the slab. The specimen *d* was some little distance from the others.

The seeds vary in size from 1·30 cm. to 2 cm. long, and from 0·50 cm. to 0·70 cm. wide.

Locality.—Lewis Burn, rather over 200 yards below Lewis Burn Colliery, North Tynedale, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

Cordaicarpus, Geinitz.

Cordaicarpus planus, Kidston, n.sp.

1883. (?) *Cardiocarpus apiculatus*, Kidston (*non* Göppert), *Trans. Roy. Soc. Edin.*, vol. xxx. p. 545, pl. xxxi. figs. 13, 13*a*.

Small oval or pointed seeds, about 0·70 cm. long, and rather less wide. Surface smooth, and surrounded by a narrow wing or border.

These small seeds vary in form. At plate xxxi. fig. 13 (*l.c.*) is shown a specimen terminating in a point, while that shown at fig. 13*a* is oval. These specimens occur on a slab thickly covered with other examples of the same species.

Locality.—Lewis Burn, North Tynedale, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

*Pity*s, Witham, emend.

*Pity*s Withami, L. and H., sp.

1831. *Observations on Fossil Vegetables*, p. 30, pl. iii. figs. 8–12.
 1831. *Pinites Withami*, L. and H., *Fossil Flora*, vol. ii. p. 9, pl. ii.
 1833. *Pinites Withami*, Witham, *Internal Structure of Fossil Vegetables*, pp. 27, 72, pl. iv. figs. 8–12, pl. v., pl. vi., figs. 1–4, pl. vii. figs. 1–6.
 1841. *Pinites Withami*, Unger, *Chloris Protogæa. Beitr. z. Flora d. Vorwelt*, p. 29.
 1845. *Pinites Withami*, Unger, *Synop. Plant. Foss.*, p. 205.
 1847. *Dadoxylon Withami*, Eudlicher, *Synop. Coniferarum fossilium*, p. 34.
 1850. *Dadoxylon Withami*, Unger, *Genera et Species*, p. 378.
 1845. *Araucarites Withami*, Göppert, *Descrip. d. Végét. foss. recueillis par M. P. de Tchihatcheff en Sibérie*, p. 10 (*Voyage scientifique dans l'Altai oriental*, pp. 379–390).
 1850. *Araucarites Withami*, Göppert, *Monog. d. foss. Coniferen*, p. 231.
 1870. *Araucarioxylon Withami*, Kraus, in Schimper, *Traité d. paléont. végét.*, vol. ii. p. 384.
 1880. *Pity*s Withami, Göppert, *Revision meiner Arbeiten über die Stämme der fossilen Coniferen*, p. 18.
 1902. *Pity*s Withami, Scott, *Trans. Roy. Soc. Edin.*, vol. xl. p. 354, pl. ii. fig. 10, pl. vi. fig. 21.
 1831. Witham (*Pinites medullaris*, L. and H.), *Trans. Nat. Hist. Soc. of Northumberland, Durham, and Newcastle-upon-Tyne*, vol. i. p. 297, pl. xxv. figs. 3–8.
 1831. *Pinites medullaris*, L. and H., *Fossil Flora*, vol. i. p. 13, pl. iii.
 1833. *Pinites medullaris*, Witham, *Internal Structure of Fossil Vegetables*, pp. 35, 72, pl. vi. figs. 5–8, pl. vii. figs. 7, 8.
 1845. *Pinites medullaris*, Unger, *Synop. plant. foss.*, p. 205.
 1845. *Araucarites medullaris*, Göppert, *Descriptions d. végét. foss. recueillis par M. P. de Tchihatcheff en Sibérie*, p. 10.
 1850. *Araucarites medullaris*, Göppert, *Monog. d. foss. Coniferen*, p. 231.
 1847. *Dadoxylon medullare*, Eudlicher, *Synop. Coniferarum fossilium*, p. 34.
 1890. *Dadoxylon medullare*, Knowlton, *Revision of the Genus Araucarioxylon of Kraus, etc.*, *Proc. U. S. Nat. Museum*, vol. xii. p. 610.
 1870. *Araucarioxylon medullare*, Kraus, in Schimper, *Traité d. paléont. végét.*, vol. ii. p. 385.
 1880. *Pity*s medullaris, Göppert, *Revision meiner Arbeiten über die Stämme der fossilen Coniferen*, p. 18.

Locality.—In Syke, west from Eastnook, near Elsdon, Northumberland.

Horizon.—Near top of the Calciferous Sandstone series.

*Pity*s primæva, Witham, sp.

1833. *Pity*s primæva, Witham, *Internal Structure of Fossil Vegetables*, pp. 37–39, 71, pl. viii. figs. 4–6, pl. xvi. fig. 2.
 1841. *Pissadendron primævum*, Unger, *Chloris protogæa. Beitr. z. Flora d. Vorwelt*, p. 29.
 1845. *Pissadendron primævum*, Unger, *Synop. plant. foss.*, p. 205.
 1847. *Pissadendron primævum*, Eudlicher, *Synop. Coniferum fossilium*, p. 33.
 1850. *Pissadendron primævum*, Göppert, *Monog. foss. Coniferen*, p. 230.
 1850. *Pissadendron primævum*, Unger, *Genera et species*, p. 377.

1845. *Araucarites primæva*, Göppert, *Descriptions d. végét. foss. recueillis par M. P. de Tschihatcheff en Sibérie*, p. 11.
 1870. *Araucarioxylon primævum*, Kraus, in *Schimper, Traité d. paléont. végét.*, vol. ii. p. 385.
 1880. *Pitys primæva*, Göppert, *Revision meiner Arbeiten über die Stämme der fossilen Coniferen, etc.*, p. 18.
 1902. *Pitys primæva*, Scott, *Trans. Roy. Soc. Edin.*, vol. xl. p. 355, pl. ii. fig. 11, pl. vi. figs. 22–23.

Locality.—River Irthing, below Lampert and Shankend, county boundary between Cumberland and Northumberland.

Horizon.—Near the top of the Calceiferous Sandstone series.

Incertæ sedis.

Ptilophyton, Dawson.

Ptilophyton plumula, Dawson.

Ptilophyton plumula, Dawson, sp. See *ante*, p. 761.

Locality.—Head of Black Burn, Humble Burn, two and a quarter miles S.W. of Cranecluch, Northumberland.

Horizon.—Lower part of Calceiferous Sandstone series.

Locality.—King Water, half mile S. of Spottey Bank, Northumberland.

Horizon.—Calceiferous Sandstone series, near base of Fell Sandstones.

Sorocladus, Lesquereux.

1879–1880. *Sorocladus*, Lesqx., *Coal Flora*, vol. i. p. 327.

Note.—I employ this genus as originally proposed by Lesquereux, with no further significance than that the fossil included here is a fern fructification.

Sorocladus antedecens, Kidston.

1887. *Sorocladus antedecens*, Kidston, *Trans. Roy. Soc. Edin.*, vol. xxxiii. p. 143, pl. viii. fig. 6b.

Locality.—Lewis Burn, over 200 yards below Lewis Burn Colliery, Northumberland.

Horizon.—Carbonaceous series = Scremerston group.

The foregoing list of plants from Northumberland and Cumberland contains the species from all the divisions of the Calceiferous Sandstone series of that area ; and with the purpose of comparing the fossil plants from the same rocks of Dumfriesshire with those from the North of England a table is given, showing in the first column the fossil plants from the North of England, the second column contains the Dumfriesshire specimens, while the third column shows the further distribution of these plants in the Calceiferous Sandstone series of other areas of Scotland.

	Calcareous Sandstone Series.		
	North of England.	Dumfries- shire.	Other areas of Scotland.
<i>Bythotrephes acicularis</i> , Göpp., sp.,	x	x	
„ <i>plumosa</i> , Kidston, sp.,	x	x	
„ <i>simplex</i> , Kidston, sp.,		x	
„ <i>Scotica</i> , Kidston, sp.,		x	
„ <i>gracilis</i> , var. <i>intermedia</i> , Hall,		x *	
„ „ var. <i>crassa</i> , Hall,	x		
<i>Spirophyton caula-galli</i> , Vanuxem, sp.,		x	x
<i>Calymmatotheca bifida</i> , L. and H., sp.,	x	x	x
„ <i>affinis</i> , L. and H., sp.,	x		x
<i>Sphenopteris elegans</i> , Brongt.,	x		x
„ <i>crassa</i> , L. and H.,		x	x
„ <i>pachyrrhachis</i> , Göpp.,		x	x
„ <i>Macconochiei</i> , Kidston, sp.,		x	
„ <i>obovata</i> , L. and H.,		x	x
„ <i>Hibberti</i> , L. and H., var.,		x	x
„ <i>decomposita</i> , Kidston,	x	x	x
„ <i>dicksonioides</i> , Göpp., sp.,	x		
„ sp.,		x	
„ sp.,	x		
<i>Rhodea Machaneki</i> , Ett., sp.,		x	x
„ <i>patentissima</i> , Ett., sp.,	x		x
„ <i>moravica</i> , Ett., sp.,	x		x
„ <i>dissecta</i> , Brongt., sp.,	x		x
<i>Rhacopteris inaequilatera</i> , Göpp., sp.,		x	x
„ <i>Geikiæ</i> , Kidston, sp.,		x	
„ <i>flabellata</i> , Tate, sp.,	x		x
„ <i>subcuneata</i> , Kidston,	x		
<i>Adiantites antiquus</i> , Ett., sp.,	x		x
<i>Cardiopteris polymorpha</i> , Göpp., sp.,	x	x	x
<i>Alcicornopteris convoluta</i> , Kidston,	x	x	x
<i>Eskdalia minuta</i> , Kidston,	x	x	
<i>Asterocalamites scrobiculatus</i> , Schl., sp.,	x	x	x
<i>Volkmania</i> , sp.,		x	
<i>Pinnularia</i> , sp.,		x	x
<i>Lepidodendron Veltheimi</i> , Sternb.,	x	x	x
„ <i>Volkmannianum</i> , Sternb.,	x		x
„ <i>Harcourtii</i> , Witham,	x		
<i>Bothrodendron Kidstoni</i> , Weiss,	x	x	
„ <i>Wukianum</i> , Kidston,		x	x
<i>Lepidophyllum lanceolatum</i> , L. and H.,	x	x	x
<i>Lepidostrobus variabilis</i> , L. and H.,	x	x	x
„ <i>fimbriatus</i> , Kidston,	x	x	
<i>Stigmaria ficoïdes</i> , Sternb., sp.,	x	x	x
„ „ var. <i>undulata</i> , Göpp.,	x	x	x
<i>Cordaïtes</i> , sp.,		x	x
<i>Samaropsis nervosa</i> , Kidston, sp.,	x		
<i>Rhabdocarpus curvatus</i> , Kidston,	x		
<i>Cordaïcarpus planus</i> , Kidston,	x		
<i>Carpolithes</i> , sp.,		x	
<i>Pityx Withami</i> , L. and H., sp.,	x		x
„ <i>primæva</i> , Witham, sp.,	x		x
<i>Ptilophyton plumula</i> , Dawson, sp.,	x	x	
<i>Schutzia</i> , sp.,		x	
<i>Sorocladus antecessens</i> , Kidston,	x		

* This specimen comes from Kirkcudbrightshire.

This table shows very clearly the great similarity of the fossil flora of Dumfriesshire and the North of England, and also its agreement with other areas of the Calciferous Sandstone series of Scotland.

I have little doubt that further collecting in Cumberland and Northumberland would augment the lists of Calciferous Sandstone plants from these counties.

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EXPLANATION OF PLATES.

PLATE I.

Fig. 1. *Bythotrephes gracilis*, Hall, var. *intermedia*, Hall. Arbigland, Kirkcudbrightshire. Collected by Mr J. Linn. Natural size. Reg. No. K/3236.

Figs. 2-3. *Bythotrephes Scotica*, Kidston. Glencartholm, Eskdale. Specimens in the Collection of the Geological Department of the British Museum. Natural size.

Fig. 4. *Eskdalia minuta*, Kidston. Glencartholm, Eskdale. Natural size. Reg. No. K/2740.

Figs. 5-6. *Eskdalia minuta*, Kidston. Scars enlarged from last specimen. Fig. 5 \times 2.

Fig. 7. *Eskdalia minuta*, Kidston. Glencartholm, Eskdale. Natural size. Reg. No. K/2739.

Fig. 8. *Eskdalia minuta*, Kidston. Scars from last specimen, enlarged.

Fig. 9. *Pinakodendron Macconochiei*, Kidston, n.sp. River Esk, left bank, about 30 yards below junction of Byre Burn, Canonbie. Portion of cortex showing leaf scars and ornamentation of outer surface. \times 3. Reg. No. K/3146.

Fig. 10. *Pinakodendron Macconochiei*, Kidston, n.sp. Same specimen as last. Natural size.

Fig. 11. *Pinakodendron Macconochiei*, Kidston, n.sp. Ornamentation of surface of cortex much enlarged. Same specimen as fig. 10.

Fig. 12. *Cordaicarpus Cordai*, Geinitz, sp. A few yards above bridge at foot of Byre Burn, Canonbie. Natural size. Reg. No. K/3167.

Fig. 13. *Cordaicarpus Cordai*, Geinitz, sp. Same specimen enlarged \times 3.

PLATE II.

Fig. 14. *Rhabdocarpus curvatus*, Kidston, n.sp. Lewis Burn, rather over 200 yards below Lewis Burn Colliery, North Tynedale, Northumberland. Specimen in the Collection of the Geological Survey of Great Britain, Jermyn St., London. Natural size.

Fig. 15. *Stigmaria* (? *Stigmariopsis*) *rimosiformis*, Kidston, n.sp. River Esk, right bank, about 150 yards below Gilnockie Bridge, Eskdale. Natural size. Reg. No. K/3189.

Fig. 16. *Sphenopteris*, sp. Shore west of Budle, Northumberland. Specimen in the Collection of the Geological Survey of Great Britain, Jermyn St., London. Natural size.

Fig. 17. *Lepidodendron fusiforme*, Corda, sp. Near Halifax, Yorkshire. From plaster cast of impression in the Collection of the Geological Department, British Museum. Natural size.

Fig. 18. *Lepidodendron fusiforme*, Corda, sp. Outline sketch of cushion and leaf scar from last specimen. Natural size.

Fig. 19. *Lepidodendron Volkmannianum*, Sternb. Quarry one mile S.W. of Glororum farm-house, Bamforth, Northumberland. Specimen in the Collection of the Geological Survey of Great Britain, Jermyn St., London. Natural size.

Figs. 20-21. *Lepidodendron Glincanum*, Eichwald, sp. River Esk, right bank, about 200 yards above foot of Byre Burn, Canonbie. Natural size. Fig. 20, Reg. No. K/3125. Fig. 21, Reg. No. K/3124.

PLATE III.

Fig. 22. *Lepidodendron fusiforme*, Corda, sp. Jockie's Syke, one mile E. by N. of Riddings Junction, Cumberland. Portion of specimen shown at fig. 25. \times 2.

Fig. 23. *Lepidodendron fusiforme*, Corda, sp. Outline sketch of cushion and leaf scar from same specimen. \times 2.

Fig. 24. *Lepidodendron fusiforme*, Corda, sp. Leaf scar from same specimen. \times 3½.

Fig. 25. *Lepidodendron fusiforme*, Corda, sp. Jockie's Syke, one mile E. by N. of Riddings Junction, Cumberland. Natural size. Reg. No. K/3186.

Fig. 26. *Sigillaria Canobiana*, Kidston, n.sp. River Esk, right bank, about 200 yards above foot of Byre Burn, Canonbie. Natural size. Reg. No. K/3118.

Figs. 27–28. *Lepidodendron Glincanum*, Eichwald, sp. River Esk, right bank, about 200 yards above foot of Byre Burn, Canonbie. Natural size. Fig. 27, Reg. No. K/3126. Fig. 28, Reg. No. K/3122.

PLATE IV.

Fig. 29. *Sigillaria Canobiana*, Kidston, n.sp. Portion of specimen shown on Pl. III. fig. 26. $\times 2$.

Fig. 30. *Sigillaria Canobiana*, Kidston, n.sp. Outline sketch of leaf scar and portion of rib from same specimen. $\times 2$.

Figs. 31–32. *Sigillaria Canobiana*, Kidston, n.sp. River Esk, right bank, about 200 yards above foot of Byre Burn, Canonbie. Figure $\times 2$. Reg. No. K/3115. Fig. 32, outline leaf scar from same specimen, $\times 2$.

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Figs. 34–35. *Sigillaria Canobiana*, Kidston, n.sp. Portion of last specimen, $\times 2$. Fig. 35, outline sketch of leaf scar of same, $\times 2$.

Fig. 36. *Calamites (Calamitina) pauciramis*, Weiss. River Esk, right bank, about 30 yards below junction of Byre Burn, Canonbie. Natural size. Reg. No. K/3144.

Figs. 37–38. *Lepidodendron Glincanum*, Eichwald, sp. Portion of specimen shown on Pl. II. fig. 21, $\times 2$. Fig. 38, outline sketch of cushion and leaf scar, $\times 2$.

Figs. 39–40. *Lepidodendron Glincanum*, Eichwald, sp. Portion of specimen shown on Pl. II. fig. 20, $\times 2$. Fig. 40, outline sketch of cushion and leaf scar, $\times 2$.

PLATE V.

Fig. 41. *Lepidodendron Glincanum*, Eichwald, sp., var *rimosum*, Schmalhausen. River Esk, right bank, about 200 yards above foot of Byre Burn, Canonbie. Natural size. Reg. No. K/3127.

Figs. 42–43. *Lepidodendron Glincanum*, Eichwald, sp. Portion of last specimen, $\times 2$. Fig. 43, outline sketch of cushion and leaf scar, $\times 2$.

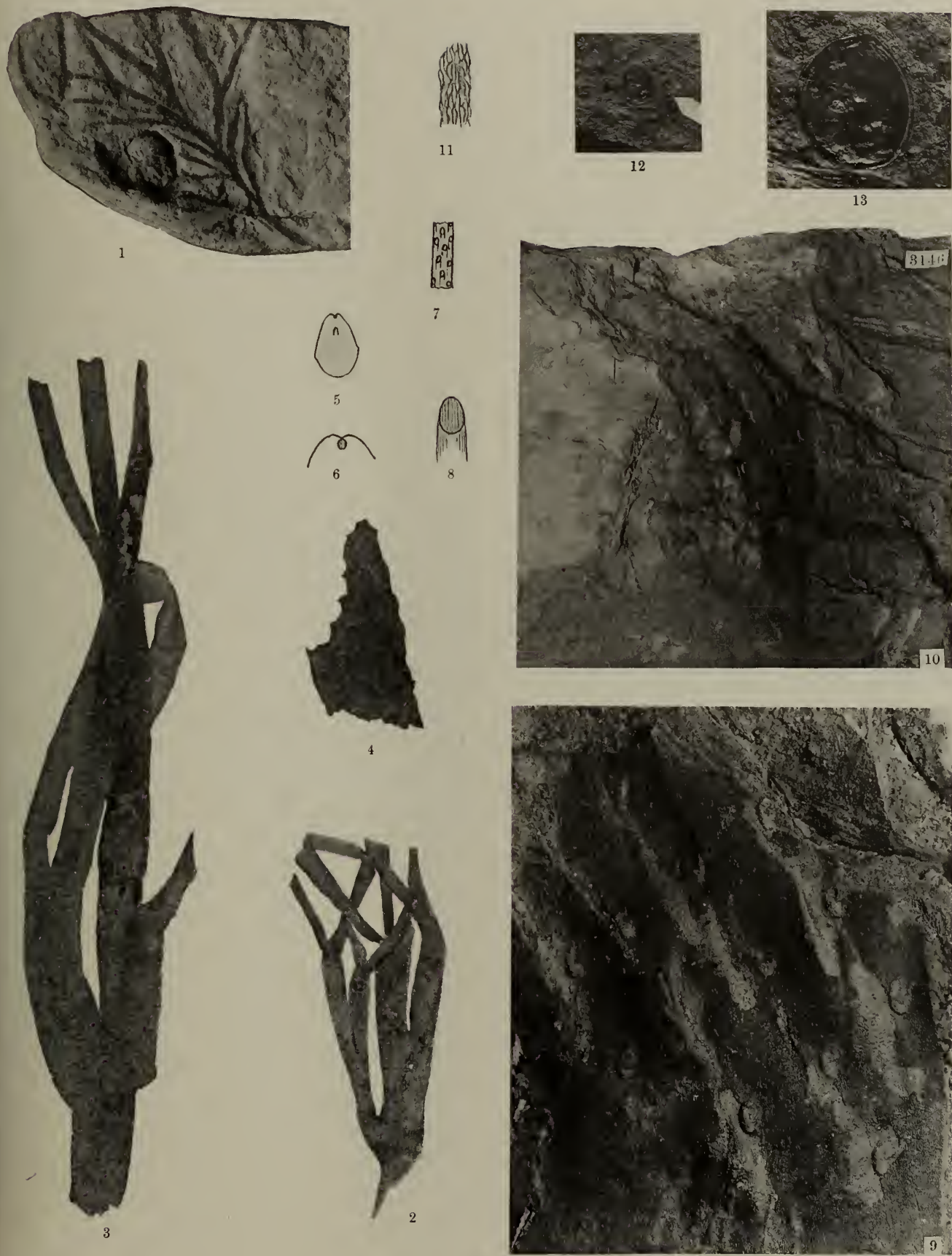
Fig. 44. *Calamites (Calamitina) pauciramis*, Weiss. River Esk, left bank, about 30 yards below junction of Byre Burn, Canonbie. Natural size. Reg. No. K/3145.

Fig. 45. *Sigillaria Canobiana*, Kidston, n.sp. River Esk, right bank, about 200 yards above foot of Byre Burn, Canonbie. Natural size. Reg. No. K/3120.

Figs. 46–47. *Sigillaria Canobiana*, Kidston, n.sp. Portion of same specimen as last, $\times 2$. Fig. 47, outline sketch of leaf scar and rib, $\times 2$.

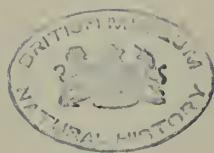
Figs. 48–50. *Rhodea Moravica*, Ettingshausen, sp. Shore west of Budle, Chesterfield Slakes, Northumberland. Specimens in the Collection of the Geological Survey of Great Britain, Jermyn St., London. Figs. 48–49, natural size. Fig. 50, pinnule enlarged.

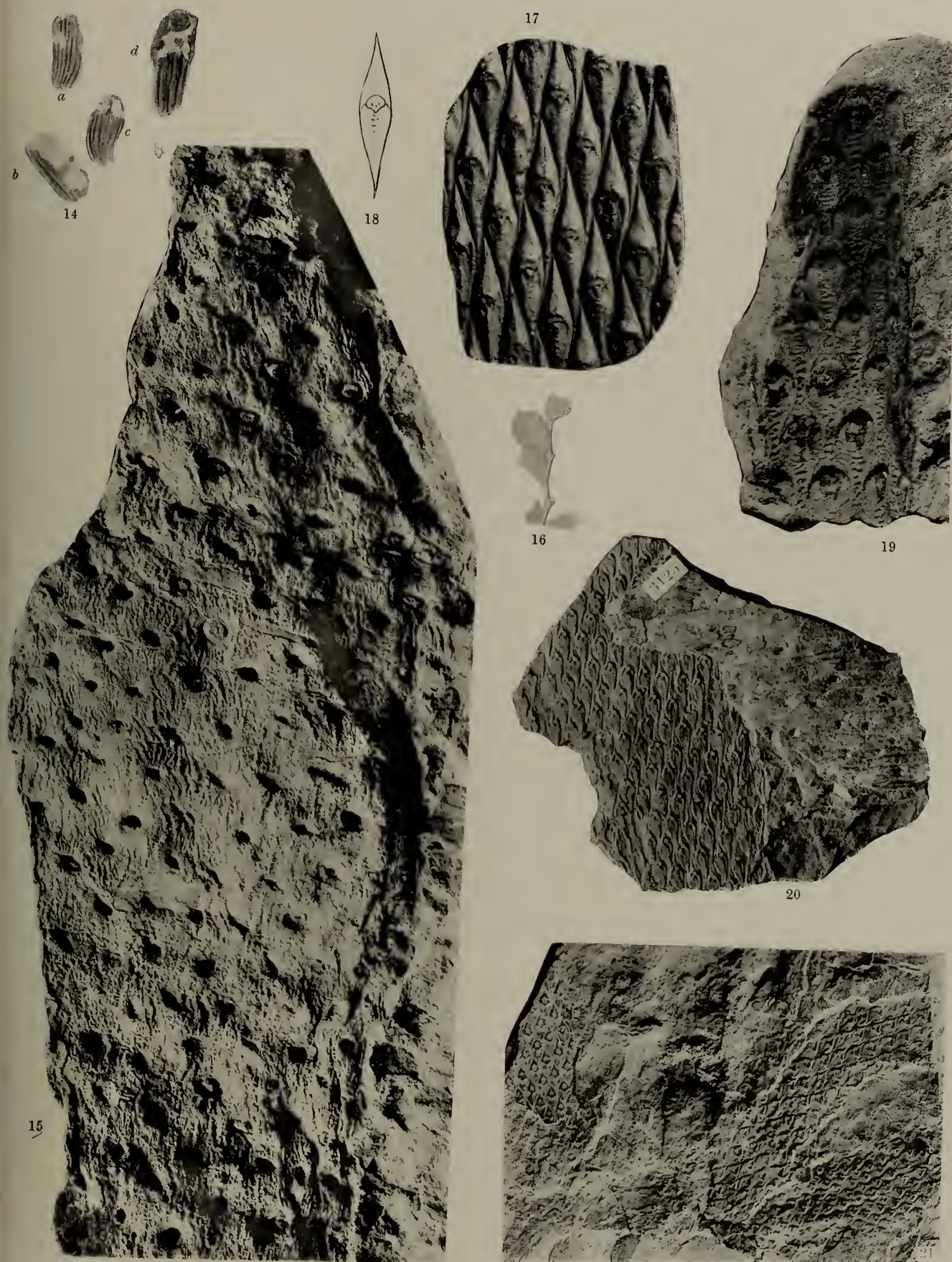
Note.—The registration numbers distinguished by a “K” refer to specimens in the Author’s collection.



Kidston, Photo.

Fig. 1. *Bythotrephis gracilis*, Hall, var. *intermedia*, Hall. Figs. 2, 3. *Bythotrephis Scotica*, Kidston. Figs. 4-8. *Eskdalia minuta*, Kidston.
Figs. 9-11. *Pinakodendron Macconochiei*, Kidston. Figs. 12, 13. *Cordaicarpus Cordai*, Geinitz sp.

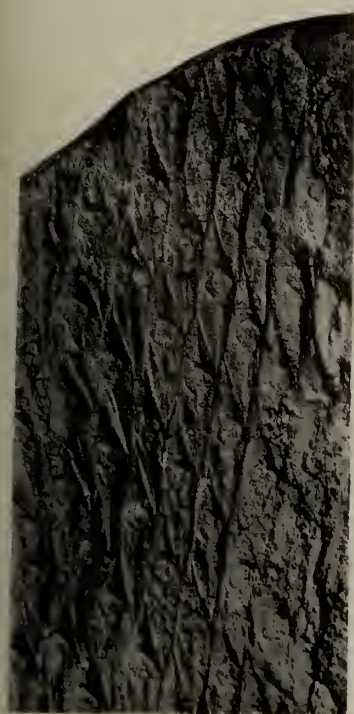




R. Kidston. Photo.

Fig. 14. *Rhabdocarpus curvatus*, Kidston. Fig. 15. *Stigmaria* (? *Stigmariopsis*) *rimosiformis*, Kidston. Fig. 16. *Sphenopteris* sp.
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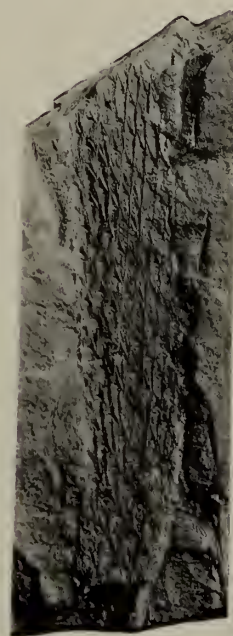




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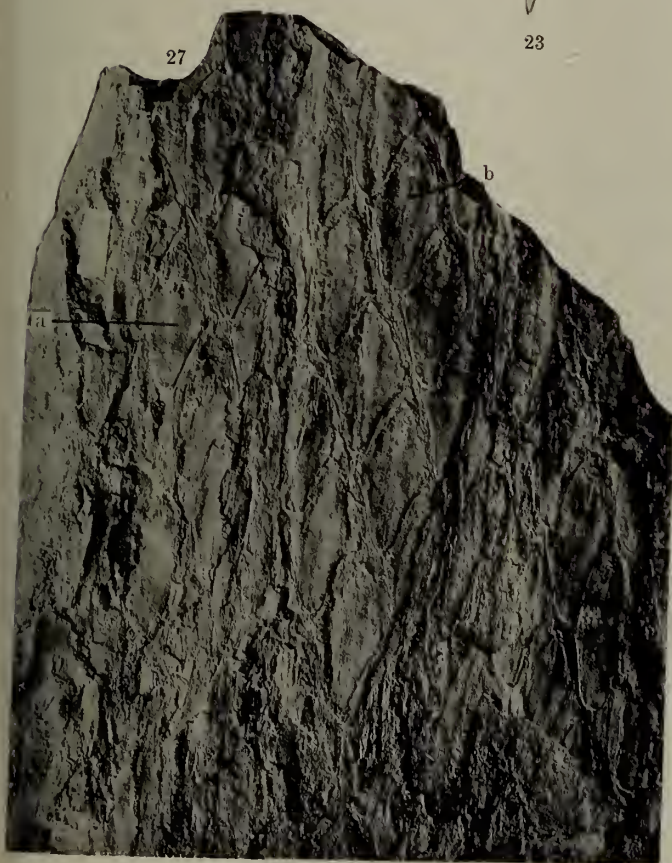
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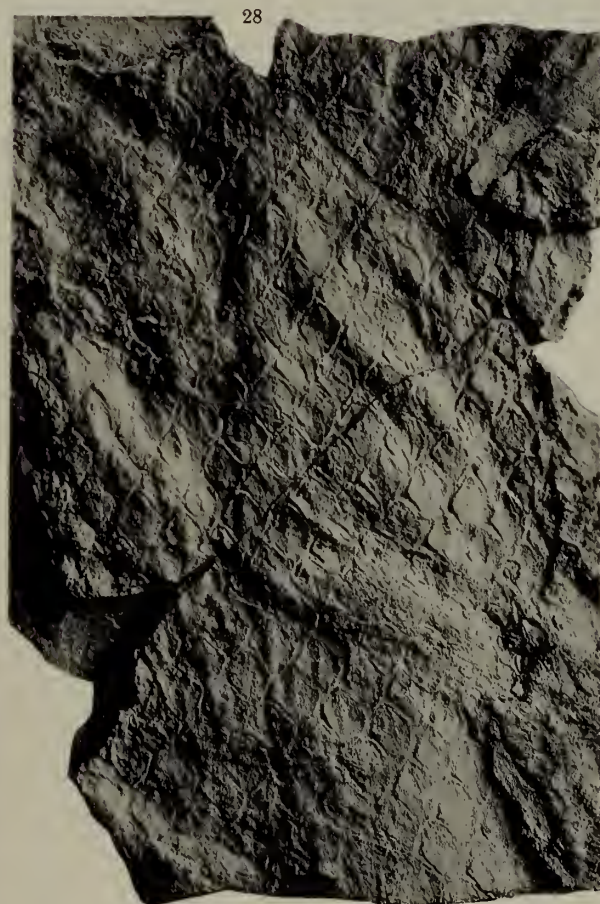
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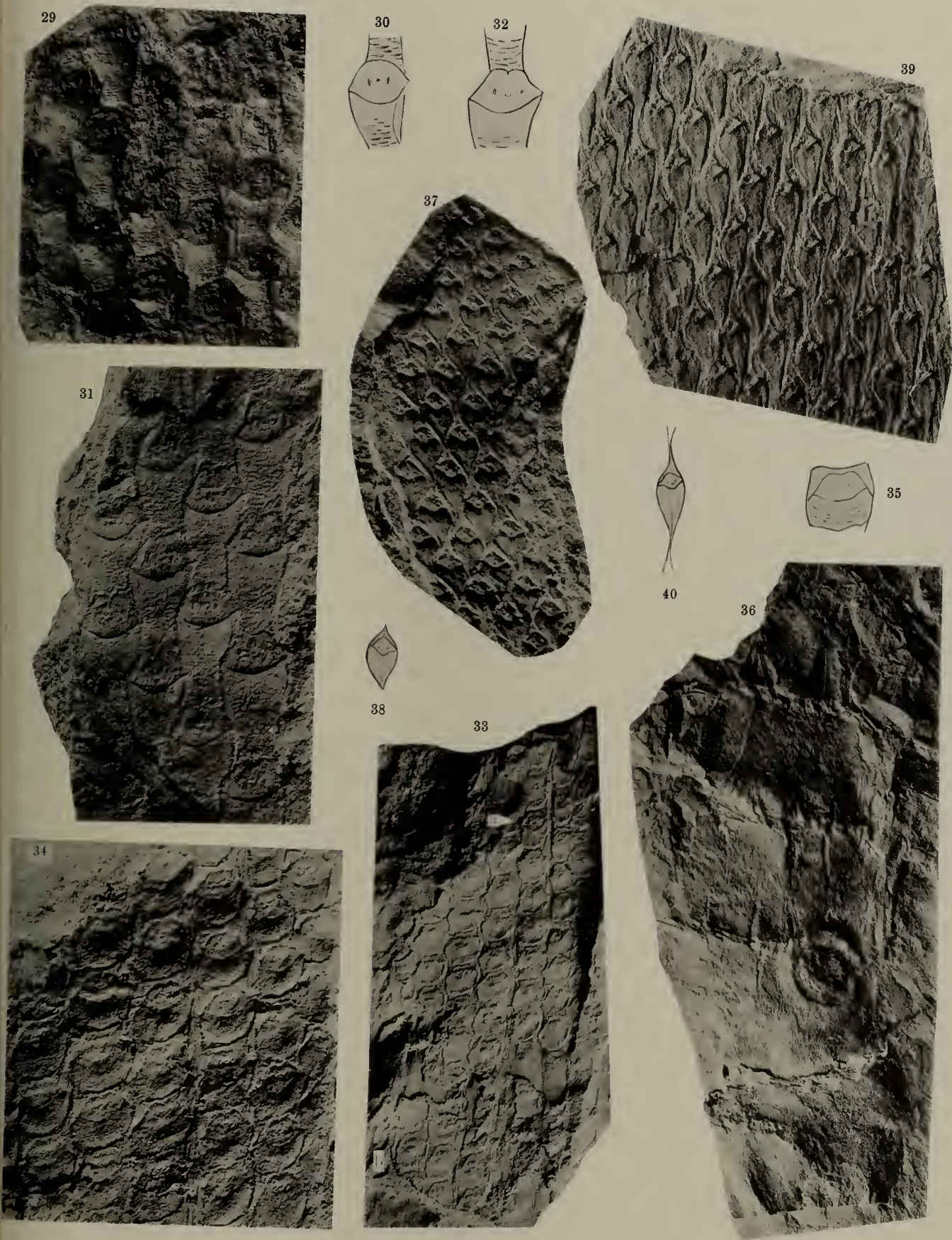
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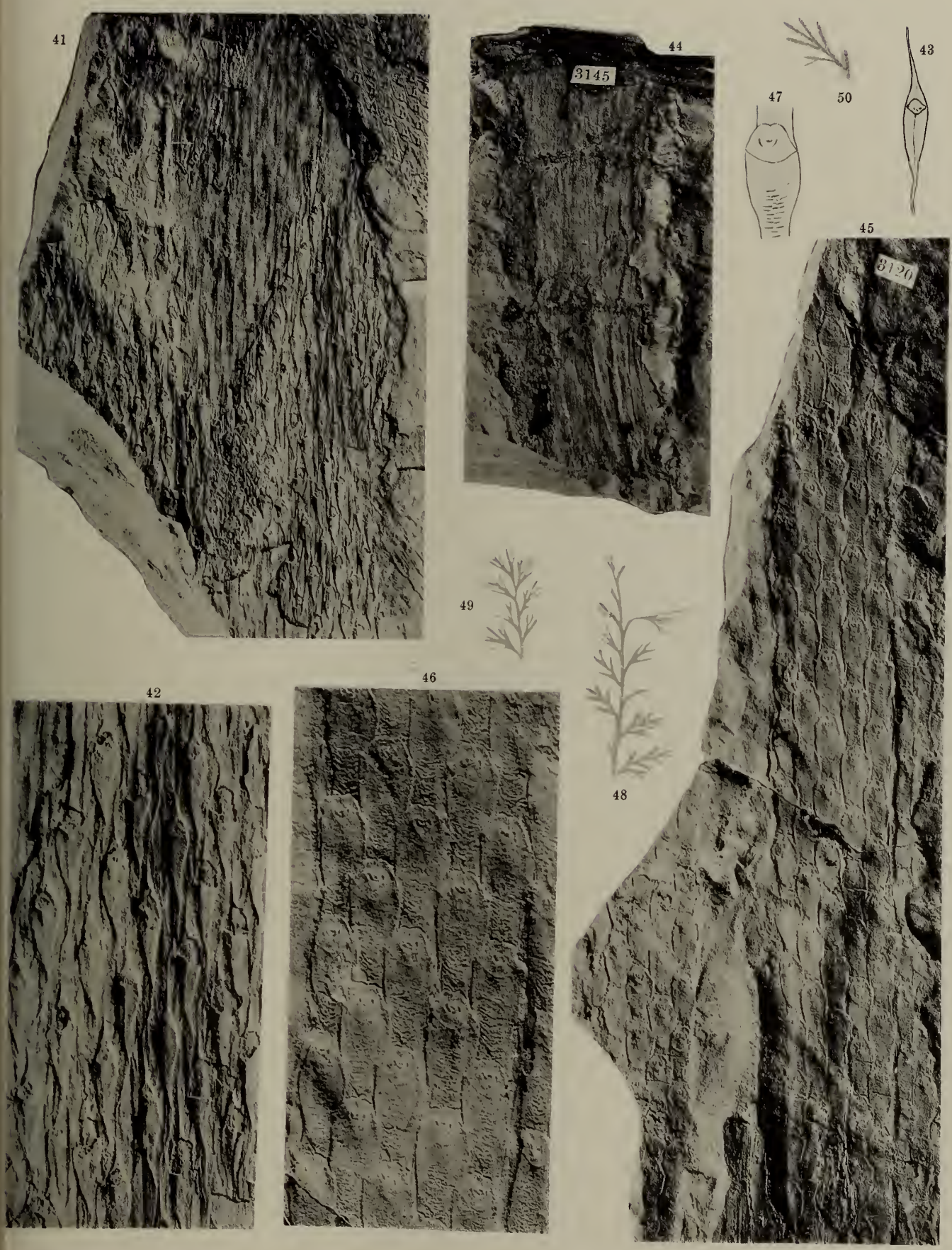
R. Kildston, Photo.





R. Kidston. Photo.

Figs. 29-35. *Sigillaria Canobiana*, Kidston. Fig. 36. *Calamites (Calamitina) pauciramis*, Weiss. Figs. 37-40. *Lepidodendron Glincanum*, Eichw. sp.



R. Kidston, Photo.

Fig. 41-43. *Lepidodendron Glincanum*, Eichw. sp. Fig. 44. *Calamites (Calamitina) pauciramis*, Weiss. Figs. 45-47. *Sigillaria Canobiana*, Kidston. Figs. 48-50. *Rhodea Moravica*, Ett. sp.

